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IRRIGATION IN SOUTHERN INDIA.

III.

The Basin of the Kaveri (Cauvery).

We propose to continue our description of the river basins of India, proceeding northwards from Cape Comorin. In our number for December 1874 (p. 364) we gave some account of the Tamraparni system of irrigation, in the extreme south of India; and in November of the same year (p. 328) we described the Periyâr project, and the system of irrigation from the Vaigai River, in the district of Madura. Proceeding northwards, the next irrigation system is connected with the far more extensive river basin of the Kaveri (Cauvery). The Kaveri basin has an area of 27,700 square miles, and the length of the river's course is 472 miles. The hypsographical map of Southern India facing page 329 of our number for November 1874 will also serve to illustrate the present article.

The sources of the Kaveri lie in the mountainous recesses of the Western Ghâts; the most northern, called the Hemavati and Yagachi, rising in Hassan, a province of Mysor; the Kaveri itself and the Lakshmantirtha, in Coorg; the Kabbani and Nugu, in Wainaad; and the Moyaar and Bhowani, in the Nilgiri hills. These districts border on each other from north to south. First the mountainous region of Hassan, then the lovely ridges and ravines of Coorg, contain the fountains of the sacred river itself. Coorg is divided from the Wainaad district by the Brahmagiri Range, and Wainaad extends for a length of about 50 miles to the feet of the Nilgiris, which rise up from the Wainaad plateau like a massive wall, with many silvery cascades pouring over its face. On the western or Malabar side these mountains rise abruptly from the plain, and are covered with magnificent forest. The plateaux are broken into a succession of ridges, sometimes rising into lofty peaks, which enclose valleys or flats; while on the eastern side the descent is more gradual, and is also covered with forest. The peaks rise to heights of 5000 to 8000 feet.

The S.W. monsoon strikes full against the western scarp of the ghâts, and here there is a rainfall of 160 inches. But the western wall is steep, and the drainage area on that side is narrow; so that the largest proportion of the water from the S.W. monsoon is received by the sources of Kaveri, and taken away across India to the eastern coast. It is nearly all deposited between the months of May and September. The greatest fall, of course, takes place along the western faces of the ghâts, where the clouds, heavily charged with the moisture from the Indian Ocean, suddenly enter the colder stratum caused by the mountains, and are at once condensed. As they advance across the plateaux the rainfall sensibly decreases, and in Mysor, to the eastward, there is a very dry belt of less than 30 inches fall in the year, the clouds having been wrung dry. But, on the plateaux, the rainfall, in special localities, is affected by the smallest variation of aspect and shelter. While the rainfall of the western scarp is 160 to 200 inches, it is only 140 inches in about the centre of Coorg and Hassan, and 86 on the Dodabetta peak, in the Nilgiris. At the Chumbra hill, in Wainaad, the rainfall is 186 inches on the western, and 154 inches at only a few miles' distance, on the eastern sides, where the slopes are sheltered from the monsoon by precipitous peaks. At the chinchona plantations of Nediwutam, about 8 miles to the eastward of the line along which the S.W. monsoon first bursts, the rainfall is 127 inches. At Mysor, further away to the east, the average annual rainfall is but 29 inches.

Thus the great wealth of waters is received by the sources of the Kaveri in the mountainous recesses of the ghâts, and they send it forth over the arid regions to the eastward, where it is a necessary of life to millions of people. It is no wonder that these sources are looked upon with feelings of awe and veneration, as representing beneficent and life-maintaining deities. I propose to refer to each of the head waters, beginning from the north, treating of their courses while yet among the hills; and then to return to them when they have reached the plains, and to give some account of the useful work they there perform.

The most northern affluent of the Kaveri is the Hemavati, rising at Jávali, and flowing through the coffee district of Munjarabad in Mysor. Hemavati means "the golden river." In its upper course it receives four mountain streams—the Somavati, Aigur, Kete-halla, and Yagachi. The latter stream rises on the southern slopes of the Baba-Budan hills, and three dams are placed across it, from which irrigation channels are led off. These are the Bomdihalli dam in the Belar taluk, which provides irrigation for 290 acres from a channel 4 miles long; the Halvagal dam, three miles west of Hassan, irrigating 176 acres; and the Chengravalli dam, three miles from the confluence with the Hemavati, irrigating 168 acres. The area of the catchment basin of the Yagachi is 520

square miles, of which 28 per cent. is under the tank system. The Yagachi is the chief hill tributary of the Hemavati. It is also called the Badari, both names meaning the jujub tree, the one in Canarese, the other in Sanskrit. The Hemavati is believed to be the daughter of Daksha and the wife of Isvara. She is said to have cast herself into the fire at Daksha's sacrifice because Isvara was not invited, and to have come out of the colour of gold (*hema*). Becoming incarnate as the daughter of Himavat, she performed penance in the hope of being reunited to Isvara, who appeared to her, and directed her to take the form of a river for the good of the world.

The next river to the south is the Kaveri itself, the *Kabœris* of Ptolemy and the Greek geographers. It is also called the Dakshina Ganga. The source at Tala Kaveri, in the recesses of the Coorg mountains (12° 25′ N. lat.), is a reservoir 10 feet square by 2 deep, surrounded by wild and picturesque scenery. The Kaveri is the most sacred river in Southern India, and, in the eyes of a Brahman, to bathe in it is to be purified from all sins. Its divine origin is related in the Kaveri Mahatmya of the Agneya and Skanda Puranas. Originally the deity of the river was Vishnumaya, a daughter of Brahma. She became incarnate as Lopamudra, a nymph of exquisite beauty formed by the famous Rishi Agastya, from the most graceful parts of the beasts of the forest. She became the daughter of Kavera-muni, and hence her name of Kaveri. In order to secure happiness for her earthly father, she resolved to become a river, the merit of whose waters in absolving from all sin and blessing the earth, should accrue to him. But Agastya wished to marry her, so, to reconcile the conflicting claims, Lopamudra, or the mortal part of her nature, became the wife of Agastya, while Kaveri, or the celestial part, flowed forth as a river. Another form of the legend is that Lopamudra had resolved to become a river when Agastya asked her for his wife. She consented, though longing all the time to be a river, on condition that she might forsake him whenever she was left alone. One day he left her to go and bathe, when she instantly jumped into his holy tank, and flowed forth as the River Kaveri. The Rishi, on his return, ran after her in despair; but he was only allowed the melancholy satisfaction of instructing her what direction to take in her course towards the Bay of Bengal. Near the source of the Kaveri it is joined by a mountain stream called the Kaniki, the nymph of which is also the heroine of a romantic legend. Three temples stand at the junction of the Kaniki and Kaveri, and several thousand devotees repair to the annual feast at Tala Kaveri in September. The upper course of the river is very tortuous, with banks overgrown by stately forest trees, and from November to May the depth is only about 2½ feet. The streams flowing to the Kaveri from the hills of Coorg are in ravines where there are narrow low-lying strips of rice lands between the spurs. They are retentive of moisture, and only require a tank or dam large enough to supply water three or four times at the most critical period, without sluices or stone facings. The same system also supplies the garden lands of Coorg at the head of each minor valley, the tanks not being in chains or dependent on each other. The cultivated valleys are generally covered with rice, and fringed with plantain groves and sago palm (*Caryota Urens*). The huts of the Coorgs are in the midst of these groves, generally with a small coffee garden near at hand. Thus the Kaveri commences her beneficent work as soon as she issues from her fountain, and long before she reaches the arid plains.

The next river is the Lakshmantirtha, which rises on the northern slopes of the Brahmagiri hills, drains the southern half of Coorg, and joins the Kaveri near the foot of the hills.

The Kabbani, with its tributary the Nugu, receives the drainage of Wainaad, a district averaging an elevation of 3000 feet above the sea, in the direct line of the Western Ghâts between Coorg and the Nilgiris, 60 miles long by 30 broad, with an area of 725,000 acres. The country drained by the Kabbani and Nugu consists of a belt of dense forest, here and there intersected by paddy flats. The streams are all fordable in the dry season, but during the monsoon they swell to a great size, often rising 30 feet with a width of 200, and dashing furiously along with masses of tangled branches and uprooted trees. Coorg and Wainaad are the great coffee-producing districts of Southern India.

The Nilgiri hills are drained by the rivers Moyaar and Bhowani, the one receiving all the northern streams and the others those flowing down the southern slopes. The rivers then form a sort of moat round the northern and southern sides of the Nilgiri mountain mass, and, uniting to the eastward, eventually fall into the Kaveri. The plateau of the Nilgiri and Kundah hills is 7000, and Dodabetta, the highest peak, 8640 feet above the sea. The area of these hills contains 268,494 acres. The formation, like that of Coorg and Wainaad, consists of syenitic granite with veins of basaltic rock, hornblende and quartz, while in some parts half-decomposed laterite underlies the soil. The plateau consists of undulating hills with intervening grassy valleys, thickly wooded ravines, and occasional rocky ridges running up into fine mountain peaks. The Moyaar is the most highly honoured of all the sources of the Kaveri. For it waters the precious plantations of fever dispelling chinchona trees; descending into them from the upper plateau, by a magnificent waterfall.

These are the main sources of the Kaveri. They send forth abundant supplies of water in ordinary years, and only need the regulating hand of rulers, possessed of intelligence and forethought, to secure perennial irrigation, and to prevent visitations of famine in the low countries. The action of man is causing one great change around the sources of the Kaveri. The establishment of numerous coffee plantations has given rise to widespread destruction of the primeval forest. Upwards of 60,000 acres of forest have been cleared, and the process has not by any means reached its limit. So that a great change is taking place in the physical condition of these hill districts. On the one hand the destruction of forests gives rise to an increased rapidity of surface drainage. This causes sudden and destructive floods at the outlets of the plains where the change of slope occasions a diminution of velocity, and to injurious freshes in the irrigating rivers, after they have reached the plains. On the other hand the effect of vegetation is to retard evaporation, and to check the rapidity of drainage. Consequently the floods caused by monsoon rains are increasing in violence. The rain water

rushes off the surface, instead of sinking into the earth and forming springs.

In almost all countries there is either something to check the rapid flow of the rain water in surface drainage, or else there are disastrous floods. This agency acts as a sponge. It consists either of a large area of forest, or of swamp, or of peat bog, or of a system of lakes, or of artificial reservoirs. In France there is no sponge of any kind to regulate the waters of the Loire, and, consequently, there are frequent and disastrous floods. On the Rhone, the lake of Geneva performs that important duty, and the floods are less violent and not so frequent. The Po and its numerous affluents are under control, because, at their head waters, there are efficient sponges provided by the lakes at the foot of the Alps. The River Ebro, in Spain, has no such moderator, and destructive floods in the country round Tortosa are, consequently, of no uncommon occurrence.

On the Western Ghâts the sponge was furnished by the extensive forests which clothed their sides. When the forests are removed, it is essential to the welfare of the whole Peninsula of India that a system of storing water in large artificial lakes should be substituted. Sir Arthur Cotton urged the necessity of forming such reservoirs on the Nilgiris more than forty years ago. Dr. Balfour has written two valuable papers upon the subject. But nothing has been done. Reservoirs have been proposed in Coorg and Wainaad, and a thorough examination of sites was made on the Bhowani and Moyaar Rivers by Mr. Fraser. Plans and estimates were prepared for a great reservoir on the Manal Kava. Another was proposed at a site about a mile below the junction of the two rivers; another at Palavur, on the Bhowani, where a bund 852 yards long would form an artificial lake 45 miles round, the whole area being now a wild uninhabited jungle. On the Nilgiri plateau, the streams flowing through Love Dale, and from Bishop's Down, unite on an extensive flat, where a lake could easily be formed, capable of holding 70,000,000 cubic yards of water. The construction of reservoirs in the hills is also a matter of great importance for purposes of irrigation. They will relieve the rivers of superfluous water when the floods are high, thus tending to prevent injury to the works, and will furnish supplies for irrigation when the rivers are low, owing to a failure of the usual rains. Every cubic foot of water which passes over a dam into the sea in time of floods, virtually represents so much food for the people recklessly wasted. The storage of water in artificial lakes would prevent this waste. While such reservoirs are the obvious remedy for the evils caused by the destruction of forests, they are also essential to a thorough system of irrigation and to the prevention of famines.

In his book entitled *Our Mountain Ranges*, Mr. McIvor, the late Superintendent of chinchona cultivation on the Nilgiris, has shown that dams for the formation of large reservoirs can be constructed very economically. Water can be made to form its own embankments at less than one-tenth the cost of manual labour. When properly directed, water will move earth in incredible quantities, will carry it to any distance, will deposit it in any shape required, and in the most solid and substantial manner. At a low gradient of 1 in 95, water will carry about 30 per cent. in the form of silt. At a higher gradient the quantity of silt carried is more than doubled. By the silting process bunds may be thrown across valleys to form lakes, which will irrigate hundreds of square miles of country. In 1866 Mr. McIvor's plan was practically tested by throwing a dam across the Devah Shola Valley, on the Nilgiris, for the irrigation of the lower part of a chinchona plantation. This dam contained 6525 cubic yards of earth, and it was completed by ten men in thirty-two days, at a cost of Rs. 80 of labour wages, and a total cost of Rs. 94.

If surplus water was thus stored during ordinary years, instead of being allowed to run to waste, there would be no danger of famines during extraordinary years of drought. The fountains of the Kaveri supply the water, but it must be placed under control and duly husbanded by human agency.

Having thus described the head waters of the Kaveri, we will now proceed to examine the uses that are made of those waters when they come forth from their hilly recesses; and, first, we will return to the river Hemavati, the golden stream sacred to Isvara's spouse.

The waters of the Hemavati are dammed in six places for purposes of irrigation. The first work of this kind is the great Sriramdevara *anicut*, in the Narsipur taluk of the Hassan district, which was originally constructed of rough stone by Danayaka Hebbaraiya, in 1533 A.D. It was repaired during the administration of Dewan Purnaiya (Poorniah), the able Minister of Mysor from 1800 to 1811; but in 1863 it was again breached. Since that time the English have erected a new *anicut*, a little below the former site, at a cost of 28,000*l*. Two channels are led off from it—the Uttara (or North Channel), 30 miles long, on the left bank, and the Dakshina (or South Channel), 12 miles long, on the right bank. The former irrigates 1244, and the latter, which runs through the town of Narsipur, 560 acres. The Madapur *anicut*, 10 miles below Narsipur, has channels irrigating 417 acres. The next dam is the Mandikere, with a channel 25 miles long, on the right bank, irrigating 798 acres of rice land and 172 of garden. This work is believed to be 400 years old. The Hemagiri dam is of equal antiquity. The channel drawn from it is 18 miles long, and irrigates 655 acres of the richest soil. The Akkihebbal *anicut* is composed of two sections, resting on the island of Hospatna, in the middle of the Hemavati River. It is said to have been built in 1087 A.D., and sends forth a channel 8 miles long, irrigating 219 acres. The last dam is the Kalhalli, built in 1396 A.D., with a channel also 8 miles long, irrigating 297 acres of rice land, the whole of which is assigned for the support of the Parkalswami, a guru. The Hemavati is 107 miles long. Its catchment basin covers 1292 square miles, of which the drainage of 662 is intercepted by tanks, or 51 per cent. of the area.

After the Hemavati, the River Kaveri is joined by the stream bringing down the drainage of southern Coorg, called the Lakshmantirtha. This river is crossed by seven dams. The first, called the Hanagod *anicut*, after the village of the same name, is built, like those on the Hemavati, of rough rubble stone, but its strength is greatly augmented by the rocks of the river bed. Its channel, led off from the right bank, runs for 9 miles and then divides into

three branches, the Nellur 7, the Hanumantapur 24, and Wudur 20 miles long. The Nellur follows the course of the river, and ends in the Elephant Tank at Hunasur. The other two branches pass through a deep cutting and enter the basin of the Kabbani River. Six tanks are fed by the Hanumantapur in its course; but dense jungles border the channels, and prevent extensive cultivation. The next *anicut* is called Ramenhalli, with a channel flowing for 20 miles, and passing through the town of Hunasur. But it is now breached. The Katte Malalwadi dam is about 4 miles below Hunasur, and from it a channel goes for 14 miles along the left bank, irrigating 280 acres. Next comes the Hangarhalli dam, whence flow two channels, the Seriyur and Husenpur, the former 12 miles long on the left bank, and the latter 14 on the right bank. The Marchalli dam was breached in 1864, and a new one has been constructed. The Sagarkatte *anicut* was built by the Dewan Purnaiya, and gives rise to the Anandur Channel on the right bank, which is 20 miles long and irrigates 725 acres. Lastly, the Cholanhalli dam is thrown across the Lakshmantirtha River about half a mile above its confluence with the Kaveri. It was breached in 1864, but the irrigation under the channel is kept up by the drainage of the Anandur channel, under which it runs for its whole length. The Lakshmantirtha is 64 miles long. Its catchment basin covers 662 square miles, of which 26 per cent. is under the irrigation system. There are few tanks, the system depending on *anicuts* across the river.

The small river Lokani flows into the Kaveri on the left bank before that river reaches Seringapatam, but its sources are not in the ghâts. It is only 27 miles long, with a catchment basin of 175 square miles, of which 54 per cent. has the drainage intercepted for irrigation.

The Kaveri next receives the Kabbani River, bringing with it nearly all the drainage of Wainaad, including the waters of the rivers Nugu and Gundal. The confluence of the Kaveri and Kabbani is looked upon as a spot of pre-eminent sanctity. Here the Kabbani is a fine perennial river, from 150 to 200 yards in width; but at present it only irrigates one stretch of land, on the left bank. The Kabbani is 80 miles long, and its basin covers an area of 1627 square miles, of which 784 are intercepted by tanks. It has no *anicuts*, but its tributaries the Nugu and Gundal have a few across their beds. The Gundal supplies some large tanks, particularly one at Narsipur.

The main river Kaveri itself, after leaving its mountain cradle in Coorg, runs through a deep narrow gorge, with a fall of 60 to 80 feet in the rapids at Chunchankatte. It then takes a short bend to the north to meet the Hemavati, turns south-east until it receives the Lakshmantirtha, branches to form the island of Seringapatam, and soon afterwards unites its waters with those of the Kabbani. The average breadth of the Kaveri in Mysor is 300 to 400 yards as far as the confluence with the Kabbani, the maximum flood discharge being 239,000 cubic feet per second. The bed is for the most part composed of granitic rock; but in some places the bed is laid out in vegetable gardens of melons and cucumbers during the dry season. The first fresh takes place in June, and the water begins to subside in August. Along the great part of its course the Kaveri is bordered by a rich belt of wet cultivation, but there are some gaps owing to the deficiency of water supply.

The river Kaveri is dammed by no less than twelve *anicuts* within the State of Mysor. The two first occur in the Hassan hill district. The first, in the Mysor district, is a long, straggling structure of rough stone, 570 yards long, by 4 yards broad, called the Alale Katte *anicut*. It supplies the Saligram Channel on the left bank, which flows for 13¾ miles, and ends in a small tank. The next is the Hanumanta Katte, giving rise to the Mirle Channel, on the left bank, which divides, after a mile, into three branches, the Hosa-nala 6, the Hiri-nala 12, and the Attikatte, 6 miles long. The Hosa-nala receives the drainage of the Saligram Channel. The drainage of the three branches unites in the Hempapura Channel, which, after a course of 16 miles, ends in the Gullige tank. All these dams and channels were constructed by Hindu Rajahs of Mysor. Two hundred yards lower down the river there is another dam, called Chunchankatte. It stretches tortuously across the bed, a few hundred yards above the Chunchan Falls, which are 80 feet high. The Ramasamudram Channel is led off and has a course of 26 miles, feeding the large Wodayarpur tanks, and ending near the Ramanakere tank. The cultivated area receiving from this channel is 1300 acres. The dam and channel are also due to the Hindu ruler, Chikka Deva Wadeyar. Next comes the Adagur Katte *anicut*, giving rise to the Tippur Channel. It is composed of two separate dams of rough stone, resting on an island in the middle of the river. The channel has a course of 22 miles, and at its end joins the Anandur by means of an aqueduct thrown across the Lakshmantirtha River. These works were constructed by a Poligar chieftain, named Govinda Nayaka. The next *anicut* is a low, straggling structure of stone, 776 yards long, near the village of Sitapur, called Madad-katte. From it the finest channel in the Mysor country is led off, called the Chikka Deva Raya Sagar. It runs for 72 miles on the left bank of the river, irrigating an area of upwards of 10,000 acres, and at its end feeds four important tanks, the Hosahalli, Kodagalli, Madagalli, and Bannuru. Both dam and channel were constructed by the Hindu ruler whose name the channel bears. A few miles below the Madad-katte is the Deravaj *anicut*. It has a channel 8 miles long, on the right bank, which flows for 38 miles, and irrigates 5300 acres. It also works the sugar and iron factories at Palhalli. The eighth channel drawn from the Kaveri in the Mysor district is the Bhangar Doddi, the dam being thrown across the Paschima-vahini branch of the river. The channel, after crossing the island of the same name, is led over a second branch of the Kaveri, into the island of Seringapatam, by means of an aqueduct. It then divides into three branches, one entering the fort of Seringapatam by an underground duct, the second terminating at the Darya Daulat garden, and the third at the Lal Bagh, near the tombs of Haider-'Ali and his son, Tippu Saib. Next is the Ramaswami *anicut*, giving rise to two channels, the Ramaswami, on the left, and the Rajparamesvari on the right bank. The former has a course of 31 miles, irrigating 6500 acres. The latter runs for 30 miles, and irrigates an area of 2900

acres. The last dam on the Kaveri within Mysor is the Madhava-mantri, near the celebrated sand hills. It is said to date from 894 A.D. After two miles the channel from it divides into three branches, whose total length is 18 miles, irrigating 2250 acres. For the most part these works on the rivers are very ancient. The stone *anicuts* raise the water-level to the required height, the lowest on the Kaveri being 7 feet and the highest 23 feet. The channels have regulating sluices at their heads, escapes for getting rid of surplus water, silt sluices, for creating a local scour to aid in clearing the channel, and irrigation sluices, for distributing the water. The 305 miles of channels from the Kaveri alone irrigate 70,500 acres.

After its junction with the Kabbani, and from that point to the falls, the Kaveri swells into a much larger streams. Here it reaches the ancient city of Talkad, which is almost completely buried between hills of sand stretching for nearly a mile in length, only the tops of two pagodas being visible. The Kaveri is then joined from the south by the river Suvarnavati or Honnu Hole (both words meaning the "golden stream), and thence forms the boundary between Mysor and Coimbator for 40 miles. The Honnu Hole is crossed by three permanent dams. The Gajnur *anicut*, giving rise to the Bandigeri Channel, is at present out of order. The Hongalvadi *anicut* feeds the large Ramasamudra tank, near the town of Chumrajnagar. The Ganganur *anicut* feeds 6 channels and 26 tanks. There are also temporary dams, constructed, when the water is low, of stakes, mats, and sand. From these several smaller channels are taken. At Sivasamudram the Kaveri forms an island, and the two channels are precipitated down the picturesque falls of Gagana Chukki and Bar Chukki. The reunited stream has a bed 300 feet lower, and passes eastward through a wild gorge, receiving the rivers Shimsha and Arkavati from the north.

Thus the Kaveri, with its mountain tributaries, spreads fertility over the otherwise arid plains of Mysor. Two of its tributaries drain the country to the north, but do not derive their sources from the ghâts. Of these the Shimsha is one of the most important rivers in Mysor. Its sources extend over a great part of the centre of the province. It flows through the Kadaba tank, which it forms, joins the Naga stream which feeds the Turvekere tank, and the Nagini from the Kunigal tank. These, and three others supplied by its feeders, are all on the largest scale; and the lately reconstructed Muddur *anicut* is the best modern work of the kind in Mysor. The Shimsha is 73 miles long, its catchment basin covers 3224 square miles, of which 2639 are intercepted by tanks. The other river is the Arkavati, which flows through the Bangalore district from north to south, receiving the drainage of all the country between the central water-parting of Mysor and the western chain of hills. It has a course of about 63 miles. The area of its basin is 1659 square miles, of which 519 are intercepted by tanks.

The whole Kaveri system in Mysor has a total length of 646 miles; the catchment basin has an area of 11,295 square miles, 5769 of which are intercepted by tanks.

In Mysor the streams which gather from the hill-sides and fertilise the valleys are, at every favourable point, embanked so as to form tanks, the outflow of one at a higher level supplying the next lower, and so on down the course of a stream, at a few miles apart. There are 37,682 such tanks in Mysor, the largest of which, the Súlekere, is 40 miles in circumference. Most of the open country in Mysor is undulating, so that the channels from tanks and *anicuts* command but little ground, and hence the vast number of works that have been constructed. Clay is rare, and good puddle is wanting, so that leakage is common. But Mysor is highly favoured in the matter of stone. The gneiss rock splits readily into large sheets 2 inches thick, by simple application of heat to the upper surface. It can easily be divided into slabs for *anicuts*, tank waste weirs, sluices, and overfalls.

The rulers and people of Mysor have, in ancient times, worked with patient and intelligent industry to secure the benefits of the water flowing from the ghâts. To such an extent has the principle of storage been carried, that it would now require some ingenuity to discover a site within this great area suitable for a new tank.

The bunds of Mysor tanks are of every variety of length, from a quarter of a mile to a mile and a half. They are, as a rule, faced with a rough stone revetment, backed with loose rubble stones. The breadth of the earth-work is proportioned to its height, which is greatest in the centre of its length. An ordinary bund is about 12 feet broad at the top, 60 at the bottom, and 18 feet high. Each tank is supplied with one or more sluices, by which the water can be let out on the fields at pleasure. Their position is generally on a level with that of the bed of the tank. A tank sluice consists of a 2-yard-square brick or stone cistern, to keep off the sand at the front of the bund, with one or more valves or plug-holes in a stone at the bottom. The valve is attached to a long pole, and is held in an upright position by two or four vertical stone pillars to which horizontal stones are attached, through a hole in the centre of which the valve rod works. The pressure of the water upon the top of the valve keeps it sufficiently tight, when lowered into the valve-hole, to prevent the escape of the water. At the rear of the bund another cistern is built, with shutters, to admit of water being turned off in the desired direction. The two cisterns are connected by a tunnel, about 2 feet high. In addition to these sluices, each tank has one to four masonry outlets, called *codies*, by which the surplus water escapes to other tanks below.

The art of tank-digging belongs to a particular caste called Wuddas, or Wuddaru, whose customs and peculiarities are described by Dr. Buchanan.* They are a tribe of Telinga origin, although they are scattered all over the peninsula. They dig wells, canals, and tanks, make roads, and trade in salt and grain.

Although there must have been great efficiency in the irrigation system during the times of the early Hindu rajahs, who showed a marvellous grasp of the requirements of the country, and a most enlightened perseverance in continuously proceeding with the necessary works; yet it is said that the tank management fell into great disorder during the Muhammadan usurpation of Haider and Tippu. Under the restored

* *Mysore*, i., p. 216 (2nd ed.).

Hindu rule, from 1800 to 1832, they fell out of repair in many instances. The area actually under wet cultivation is the best test of the efficient state of the reservoirs, and it is one which tells in favour of British rule. The number of acres under wet and garden cultivation, from tanks and channels, was 1,705,150 from 1838 to 1842, 1,849,759 from 1842 to 1847, 2,087,929 from 1848 to 1852, 2,160,309 from 1852 to 1857, and 2,169,040 from 1858 to 1862. At the same time the tanks are not in a satisfactory state. There has, it is reported, been a want of a general plan of action under scientific direction. Many tanks are breached or in need of thorough repair, and the villagers themselves do not attend properly to their duties connected with tank conservancy as established by local custom. Greater attention is, however, being paid to the conservancy of tanks by the villagers, who are expected to fill up inequalities caused by rain on the bunds, to check the growth of weeds, to clear out tank sluices and distributing channels, to turf parts of the bunds acted upon by the waves, and generally to preserve the works by that constant care and attention which residents on the spot can alone exercise.

It is very important that water, used for irrigation, should be correctly applied. Paddy fields must be flooded, but in the case of most crops water should be kept in circulation. Except with fields of rice, irrigation should be effected by the water being conducted in channels between the rows, the moisture reaching the roots by percolation. If water is allowed to stand long upon the surface, the land becomes sour and water-logged, fever is the consequence, and the soil gets sterile and worthless.

When the Kaveri River leaves Mysor it is diverted from its course towards the sea by the Shervaroy Hills, and pursues a nearly south direction for 50 miles. It leaves behind it a vast region where thousands of acres are, through its influence, converted from arid desert into rich gardens and cultivated fields. It flows onwards to another region where its remaining waters again create a rich and fertile expanse of rice cultivation covering many square miles. In this north and south part of its course, the Kaveri receives the united waters of the Moyaar and Bhowani from the Nilgiris. The former river presents a singular instance of the action of a river in deepening its bed. The Moyaar ditch, as it is called, is 100 feet deep near the upper, and 800 feet at the lower end, the sides being very steep, and the land at the same level on both sides.

The Kaveri next receives the Noyel River flowing from Coimbatur and supplying the tanks in that district, and the Ambravati draining the northern slopes of the Anamallai and Palnai Hills. It then approaches Trichinapalli, and comes to those works which enable its waters to convert the delta into one vast irrigated garden.

It is said that the native system of irrigating the delta of the Kaveri dates from the reign of a certain Rajah Viranum in the second century of our era. It consisted of channels of supply proportioned in dimensions to the area of the tract dependent upon them for irrigation, which were cut from the river bank, and sometimes supplied with head sluices of masonry. The levels of the heads were so arranged as to command a full supply of water in moderate floods, which was led to the fields by infinite numbers of smaller channels of distribution. When the level of the river was too low for the supply of the channels, the construction of a permanent masonry or a temporary earthen dam was resorted to, to raise the water to the requisite height. Subsidiary to the general plan of river irrigation, tanks were largely employed on a gigantic scale. The embankment of the Punari tank in Trichinapalli was 30 miles long, that of the Viranum tank about 10 miles long. The old native work was at the lower extremity of Seringham island and was called the Grand Anicut. It consisted of a solid mass of rough stones of moderate size, 1080 feet long and 40 to 60 broad, stretching across the bed of the Kaveri in a serpentine form. This was a favourite mode of construction in native hydraulic works, adopted under the impression that as all natural water channels are tortuous, all artificial works in water ought to be the same. This *anicut* was built upwards of 1600 years ago.

Tanjore, including the delta of the Kaveri, was ceded to the English in 1801. At the head of the island of Seringham the main river is subdivided into two channels, the southern branch retaining the name of Kaveri, and the northern being called the Kalerun. The flood discharge is 472,500 cubic feet per second. The fall above the point of separation is 3½ feet per mile. This continues for 70 miles down the Kalerun branch, gradually lessening to 2 feet, and further on to 1 foot in a mile, while the Kaveri branch is 5 inches less per mile than the Kalerun. The latter channel had a larger volume, a more rapid slope, and a more direct channel than the Kaveri. The natural result was the progressive deterioration of the Kaveri by the formation of deposits at its head, and the consequent diversion of the great body of the main stream into the northern channel. In 1804 Captain Caldwell arrived at the conclusion that if effective measures were not adopted to rectify, by artificial means, the differences between the two branches, the inevitable result must be the annihilation of the Kaveri as an irrigating stream, and the consequent ruin of Tanjore. The old *anicut* was then raised considerably, but the root of the evil, at the separation of the two branches, was left untouched. Between 1830 and 1836 various under-sluices were constructed in the old *anicut*, and on the left bank of the Kaveri, through which sand was to be swept during freshes into the Kalerun, the bed whereof was lower than that of the Kaveri.

The name of Sir Arthur Cotton is inseparably connected with these works. His plans were submitted in 1834, and sanctioned in 1836. Before the construction of the new works the area of irrigation dependent on the Kaveri was 504,900 acres, and on the Kalerun 165,000 acres. There was too much water in the Kalerun, and too little in the Kaveri. The problem was to throw the excess in one branch into the bed of the other; and this was the great object of Sir Arthur Cotton's plan.

He proposed to build a masonry *anicut* across the Kalerun, the crown of which should ensure about half the supply of that branch between December and January, the average state of the river, passing into the Kaveri. The *anicut* was to be 750 yards long, divided into three parts by two islands. The northern portion was made 7 feet 4 inches, and the

remainder 5 feet 4 inches high. The body of the dam is of brick, capped with cut stone, and the thickness throughout 6 feet. This dam rests on a foundation of masonry 3 feet deep, built on three lines of wells, 6 feet in diameter, sunk to a depth of 6 feet in the sandy bed of the river. In rear of the dam there is an apron of masony 21 feet broad, covered with cut stone 1 foot in thickness, carefully laid in hydraulic cement. Below the apron a mass of rough stone protects the junction of the apron and river bed. Twenty-two sluices are distributed throughout the length of the dam, their sills being on the same level as the bed of the stream, to afford free passage for the sand, and to prevent the bed of the Kalerun above the dam from being raised by deposits. They failed to effect their purpose, however, and the *auicut* raised the bed of the Kalerun above it. In fact, these sluices only furnished a waterway of 44 feet in width, for scouring out the bed of a channel nearly 2200 feet broad. Their influence was practically unfelt.

In 1839 Colonel Sim reported that nothing less than complete openings from 6 to 12 feet wide would produce the desired effect. In 1843 such sluices were established, giving a total width of 129½ feet. The Kalerun was made the general escape channel for the surplus volume of water in the Kaveri. The first outlet was established 2 miles below the separation, and consisted of an under-sluice having twenty openings, giving a waterway of 120 feet. The next escape, a little lower down, was a waste weir having a waterway of 450 feet. The third was the ancient *anicut*, having a waterway of 1050 feet, and ten sluices at low levels giving 60 feet more. The fourth escape is 6 miles below the old *anicut*, being a weir of 300 feet of waterway. A sluice of twelve outlets, about 10 miles beyond, forms a fifth outlet. The sixth and last is another sluice with six vents, 12 miles lower down. Eastward of this several main channels leave the river, and pass to the sea, supplying the means of draining off the portion of the volume of the river undisposed of by the escapes above.

The effect of the Kalerun dam was to deepen the bed of the Kaveri, and cause heavy deposits in the Kalerun above the dam. There was danger that an inversion of the former relations of the two branches would arise, and measures were adopted to obtain entire control over the bed of the Kaveri.

Colonel Sim recommended the lowering of the central portion of the Kalerun dam, and his plan was adopted in 1843. This was done for a length of 700 feet, and of course added considerably to the volume of the Kalerun. His advice to construct a masonry regulating dam across the Kaveri was also adopted. A bar of masonry 650 yards long was carried across the mouth of the Kaveri in 1845, the level of the crown at the central portion being the same as that of the river bed. The effect has been a regularity of current and decrease of violence in the Kaveri, and a clearing of the Kalerun. The means adopted have proved sufficient to control the two streams in a most satisfactory manner.

The Kalerun is the grand drainage channel of the delta, and only in a minor degree an irrigating river. The Kaveri branch is essentially a channel of irrigation only. Towards the sea the main line is almost lost amongst the immense number of minor channels. All the irrigation channels are solidly and substantially embanked. The dam across the Kaveri and Vennar (one of the principal channels) is a fine work, constructed in 1848. In order to regulate the supply for South Arcot, an *anicut* was thrown across the Kalerun, in 1836, 70 miles below the head at Seringham, consisting of a bar of masonry, 8 feet high and broad, with a hollow space (3 feet by 4 feet) in the centre, arched over, and filled with rammed sand. It has 23 under sluices, an apron of masonry in the rear, and is 1901 feet long.

The area of the Kaveri delta is about 2760 square miles, and the system irrigates 835,208 acres, with a revenue of 353,033*l*.

The Kaveri is an example of a river receiving water from both monsoons, and the floods of which are utilized almost to the fullest possible extent after reaching the plains. The storage of surplus water in the hills is the measure which is necessary to preserve its catchment basin from the consequences of exceptional years of drought.

Within the same parallels of latitude, between the eastern limit of the Kaveri basin and the sea, there is a region which receives no water from the south-west monsoon, and is entirely dependent on the rains from the Bay of Bengal. It includes the basins of the Vellaur (4500 square miles), the Penar (6200), with a length of 245 miles, and the Palar (6300), with a length of 220 miles. They embrace the districts of Salem, North and South Arcot, and part of Chengalpat.

In the Carnatic the slopes of the country are much less than in Mysor, not more than 4 feet per mile, while in Mysor they are from 10 to 20 in the flat parts. Hence the channels from tanks and *anicuts* of the Carnatic command a much wider extent of ground. The rainfall of Madras is only 46 inches in the year, and the sources of the rivers do not extend, in any direction, to points where the fall is greater. But in no part of India have more strenuous exertions been made, from the earliest times, to utilize the small amount of rainfall that is available.

In South Arcot an *anicut* is built across the Vellaur River at a place called Pelandorai, with a supply channel on the right bank, regulated by a head-sluice, and connected with subsidiary channels conveying water for the irrigation of fifty villages. These works were only begun in 1870, but they are now completed. In North Arcot an *anicut* is thrown across the River Palar at the town of Vellore. It is 2600 feet long, and a channel is taken off from either bank to irrigate about 37,672 acres. The original work was constructed in 1855, but was damaged in 1874, and has since been restored. The northern part of North Arcot is drained by a tributary of the Palar River called the Poinay. Its waters are utilized chiefly to feed tanks, of which there are no less than 40,000 in this district. In 1863 several channels were cut from the left bank to feed tanks, and extensions have been projected. The tank system of the Carnatic is indeed most important, and it is purely of native origin. In 1853 no new tank had been made by us, though many had been allowed to fall into disrepair.

The tanks are formed in various ways, according to the accident of the ground. Valleys are taken possession of, and the natural drainage lines flowing

through them are checked by embankments sufficiently long to close the gorges, and high enough to retain a volume of water proportioned to the areas of irrigation situated below. Descending steps of land are occupied by a succession of reservoirs, the higher feeding the lower from its surplus supply. Dry basin-shaped hollows have banks carried round their ridges, and supplies introduced from rivers by means of special channels. Long slopes, where the fall is considerable, have portions embanked more or less regularly on three sides, and the included space forms a storage area for such volume of water as local wants may call for. The Ponairi tank, in Trichinapalli, had an embankment 30 miles long, and an area of 60 or 80 square miles, now lost to the community. The Viranum tank has an area of 35 square miles and an embankment 12 miles long, still in full operation, after an existence of fabulous duration.

The Chembrumbakam tank, about 14 miles from Madras, is one of the finest in the Presidency. It is very picturesquely situated, and looks like a natural lake, but is purely artificial. Before its enlargement it had an embankment more than 3 miles long, 28 feet in thickness, and 16 to 26 feet high, with an area of 4648 acres. It now has an area of 5729 acres, and maintains a sheet of rice cultivation nearly 10,000 acres in extent. The Kaveri-pauk tank, in North Arcot, is supplied from the Palar River, and is of great antiquity. The embankment is 3¾ miles long, and it has an area of 7 square miles. The bank is rivetted along its entire length with stone, sometimes in very massive but roughly hewn blocks. The supplying channel is about 7 miles long, and the irrigated area is nearly 7700 acres. The most formidable cause of injury to tanks is the action of waves on the embankments during gales. This action is counteracted by long slopes on the water face of the bank, and protecting coverings of rough stone. Most tanks are supplied with an outlet called *calingula*, generally of masonry built in the bund near one end. It is so much lower than the bund itself that any superabundant water can pass over it; and is closed towards the end of the rainy season, so as to keep the tank quite full. This is done by means of straw and turf, the crown of the *calingula* being generally provided with a row of rough granite posts 3 or 4 feet high, to support the wall of turf built up in front.

Thus are the rivers and streams, which would otherwise pour their waters uselessly into the sea, made to yield up their life-sustaining treasure by human industry and skill; and thus the whole physical aspect of vast areas of country is entirely altered. In India, if the water furnished by the monsoons is ever utilised thoroughly and completely, there will be no more famines; and the statesman who, through want of knowledge of the subject, speaks disparagingly of the value of works of irrigation, incurs a grave responsibility. Their importance cannot be over-estimated. Proceeding northwards, we next propose to consider the still more extensive basin of the Krishna River, including also that of the Pennair.

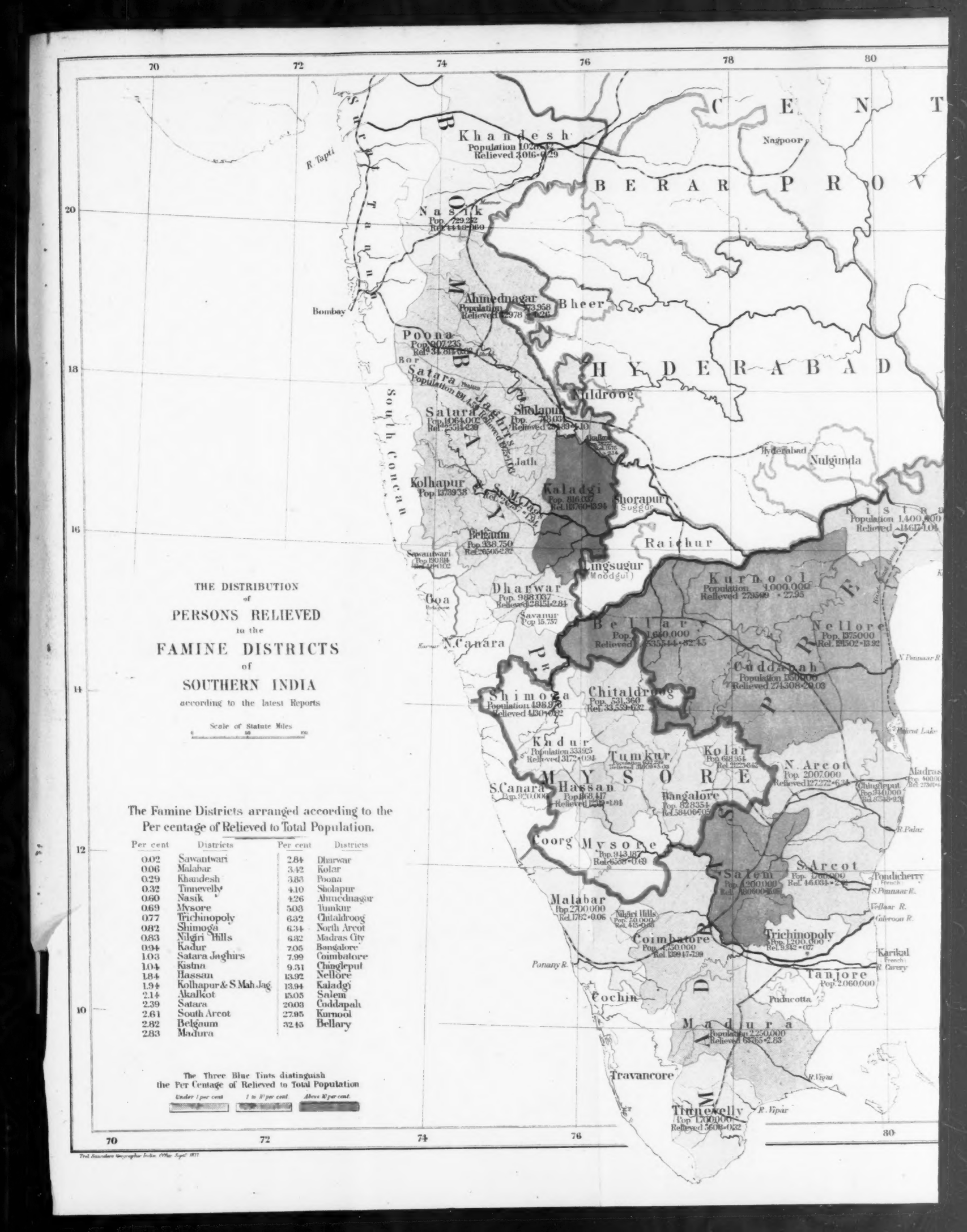
C. R. M.

THE FAMINE IN INDIA. 1876-1877.

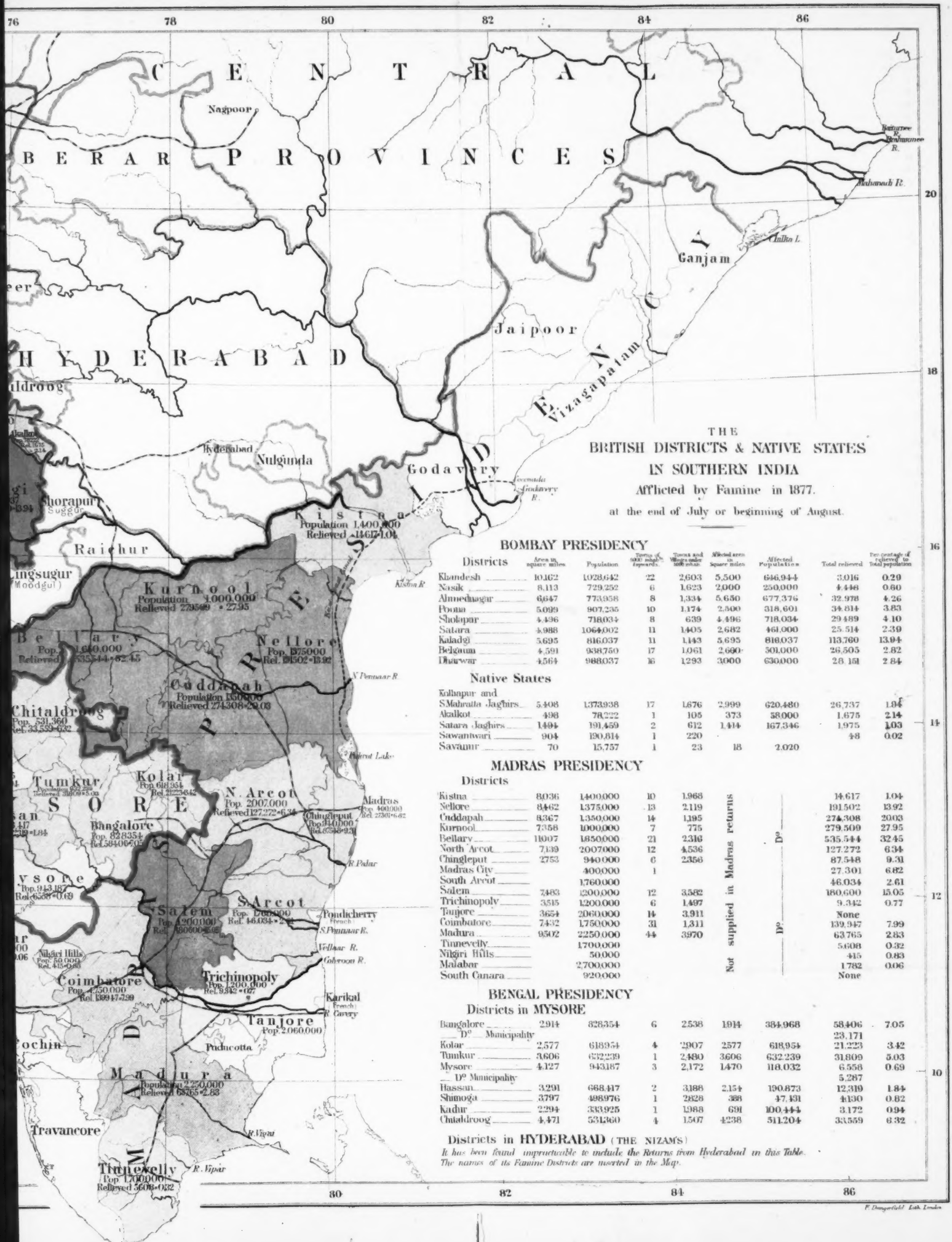
THE map which accompanies our present number shows the extent of the calamity which has aroused the sympathy of the civilised world, and in a special manner has moved the generous feelings of the English people. The coloured portion represents an area of more than 130,000 square miles, equal to more than four Irelands,* throughout which distress has rested for now more than fifteen months; distress varying indeed in degree, as is shown by the gradations of colour and the explanatory figures on the map, but everywhere serious and increasing in intensity as time went on, and one bad season was succeeded by another. In our own country the rainfall is fairly distributed throughout the year, but in India it is looked for at two seasons and from two quarters. The south-west monsoon strikes the western coast in June. The north-east monsoon, principally affects the eastern portion of the peninsula, and is due at the end of September or the beginning of October. Upon the first, which is also the most important to the country, depends the *kharif* or summer crop; upon the second, the *rabi* or winter harvest. The rains of June and July 1876 were very scanty; so much so that even on the mountains of the Western Ghâts, which receive the full force of the south-west monsoon, and never experience drought, only 86 inches of rain fell instead of the average of 126 inches, and in the plains eastward the usual supply of from 20 to 40 inches was reduced to one of from 3 to 20 inches. With the failure of the October rains the devastation of the country was complete, and famine became inevitable. Measures were at once taken to meet the coming distress. The policy of the Government of India, as expressed by Lord Lytton, was "to give all possible facilities for the transport of grain to distressed districts; to abstain from interference with the grain trade, so long as that trade was active; to give relief wages to the destitute who would labour on useful public works; to relieve gratuitously, under trustworthy supervision, the helpless poor, when the pressure of famine became extreme; and to avert death from starvation by the employment of all means practically open to the resources of the State and the exertions of its officers; but to discharge this duty at the lowest cost compatible with the preservation of human life from wholesale destruction."

The decision of the Government to abstain from interference with the grain trade has been fully justified by the result. Never has that trade in any previous famine been more active. As early as September supplies in great quantity were despatched from Central and Northern India, where fortunately the harvest had been plentiful. In December imports began to arrive from distant provinces, from Bengal and Burma especially, and from Orissa and Ganjam. From the time the distress declared itself to the end of March in the present year no less than 500,000 tons had been imported into Madras alone, and, as might be expected, the great difficulty at first was to relieve the strain upon the railways caused by this sudden demand upon their resources. For some time there was a complete block in the traffic. At Jabalpur and other stations piles of grain bags were kept waiting for days, and the shore at Madras

* See the map in our number for February 1874.



Prof. Saunders Geographer India Office Sept. 1877



THE

BRITISH DISTRICTS & NATIVE STATES IN SOUTHERN INDIA

Afflicted by Famine in 1877.

at the end of July or beginning of August.

BOMBAY PRESIDENCY

Districts	Area in square miles	Population	Towns of 5000 inhab. & upwards.	Towns and Villages under 5000 inhab.	Affected area in Square miles	Affected Population	Total relieved	Per centage of relieved to Total population
Khandesh	10,162	1028,642	22	2,603	5,500	646,944	3,016	0.29
Nasik	8,113	729,252	6	1,623	2,000	250,000	4,446	0.60
Ahmednagar	6,647	773,958	8	1,334	5,650	677,376	32,978	4.26
Poona	5,099	907,235	10	1,174	2,500	318,601	34,814	3.83
Sholapur	4,436	718,034	8	639	4,496	718,034	29,489	4.10
Satara	4,988	1064,002	11	1,405	2,682	461,000	25,514	2.39
Kaladgi	5,695	816,037	11	1,143	5,695	816,037	113,760	13.94
Belgaum	4,591	938,750	17	1,061	2,660	501,000	26,505	2.82
Dharwar	4,564	988,037	16	1,293	3000	630,000	28,151	2.84
Native States								
Kolhapur and S.Mahratta Jaghirs	5,408	1373938	17	1,676	2,999	620,480	26,737	1.94
Akalkot	498	78,222	1	105	373	58000	1,675	2.14
Satara Jaghirs	1,494	191,459	2	612	1,414	167,346	1,975	1.03
Sawantwari	904	190,814	1	220			48	0.02
Savanur	70	15,757	1	23	18	2,020		

MADRAS PRESIDENCY

Districts								
Kistna	8,036	1400,000	10	1,968	Not supplied in Madras returns		14,617	1.04
Nellore	8,462	1,375,000	13	2,119			191,502	13.92
Cuddapah	8,367	1,350,000	14	1,195			274,308	20.03
Kurnool	7,358	1,000,000	7	775			279,509	27.95
Bellary	11007	1,650,000	21	2,316			535,544	32.45
North Arcot	7,139	2007,000	12	4,536			127,272	6.34
Chingleput	2753	940,000	6	2,356			87,548	9.31
Madras City		400,000	1				27,301	6.82
South Arcot		1,760,000					46,034	2.61
Salem	7,483	1,200,000	12	3,582			180,600	15.05
Trichinopoly	3,515	1,200,000	6	1,497			9,342	0.77
Tanjore	3654	2060,000	14	3,911			None	
Coimbatore	7,432	1,750,000	31	1,311			139,947	7.99
Madura	9502	2250,000	44	3970			63,765	2.83
Tinnevelly		1700,000					5,608	0.32
Nilgiri Hills		50,000					415	0.83
Malabar		2,700,000					1,782	0.06
South Canara		920,000					None	

BENGAL PRESIDENCY

Districts in MYSORE								
Bangalore	2,914	828,354	6	2,538	1914	384,968	58,406	7.05
D° Municipality							23,171	
Kolar	2,577	618,954	4	2,907	2577	618,954	21,223	3.42
Tumkur	3,606	632,239	1	2,480	3606	632,239	31,809	5.03
Mysore	4,127	943,187	3	2,172	1470	118,032	6,558	0.69
D° Municipality							5,287	
Hassan	3,291	668,417	2	3,188	2,154	190,873	12,319	1.84
Shimoga	3,797	498,976	1	2,828	388	47,431	4,130	0.82
Kadur	2,294	333,925	1	1,988	691	100,444	3,172	0.94
Chitaldroog	4,471	531,360	4	1,507	4238	511,204	33,559	6.32

Districts in HYDERABAD (THE NIZAM'S)

It has been found impracticable to include the Returns from Hyderabad in this Table. The names of its Famine Districts are inserted in the Map.

F. Dangerfield Lith. London

showed similar signs of the deadlock; added to which, there was some difficulty in effecting the necessary interchange of traffic between the Great Indian Peninsula and the Madras Railway. Government coming to the aid of the Companies, a large number of additional engines were ordered from England or obtained from other parts of India. An officer was deputed to confer with the Companies, and by their energy, and readiness to act upon his suggestions, the accumulations were cleared away, the two lines began to work harmoniously, and grain to the amount of 2700 tons daily was passed smoothly to the districts where it was wanted. But for the railways it may safely be said that it would have been impossible to supply the wants of the people, and therefore to prevent very great mortality. The country roads throughout Madras and Bombay are for the most part fairly good, and for the conveyance of the food from the railways to distant points a system of cart transport was organised. It should be mentioned that at the outset the Madras Government, erring on the side of caution, and fearful that private trade might fail to supply certain districts, purchased secretly 30,000 tons of grain. The alarm which this proceeding produced, when it became known to the grain merchants, was allayed, however, and the error was not repeated.

With regard to relief works, the Bombay Government were the first to see that large works, on which great numbers of people could be employed and efficiently looked after, were preferable to innumerable small local works, under insufficient superintendence, very often of doubtful utility, and tending to demoralise the people by affording them easy work and fair wages close to their homes. In Bombay, therefore, several important irrigation schemes, tanks, and roads were taken in hand; and the construction of a chord line east of the ghâts was commenced, from Dhond to Munmar, to connect the branches of the Great Indian Peninsula Railway, which meet at Bombay, and thereby render it unnecessary for goods and passengers going north or south to pass over two sides of a triangle in order to reach the end of the third side. In Madras it was more difficult to devise large works of this character; but several main lines of road and large tanks were commenced, and the prosecution of the East Coast Canal afforded work to many thousands of people.

It is the experience in famines in India that a very large number of people, either from extreme helplessness, caste prejudice, or unwillingness to reveal their sufferings, refuse to resort to relief works, or are reluctant to do so. It was impressed upon the local officers that these people should be sought out and relieved, and the formation of a system of village relief and house-to-house visitation throughout the country was greatly assisted by the "headmen" of the village communities, the "tahsildars" and the revenue officers, who all possess an intimate knowledge of their respective districts.

To keep within the narrowest limits the enormous outlay involved by a system of relief dealing with millions, was a matter of the most urgent importance, and Sir Richard Temple was deputed on a special mission to Madras and Bombay, to confer with the two Governments, to impress upon them the views of the Government of India, and to assist in carrying them out. His energy and administrative ability were especially useful in Madras, where, owing to the larger area of distress, the difficulties of the situation were far greater than in Bombay. Proceeding from district to district, he everywhere personally inspected the relief operations, and by introducing uniformity of system, placed them on a more satisfactory and economical footing, He considered the wage offered to be excessive, enabling the people not only to support life, but to save money. The petty local works were in every case gladly resorted to by many who were not in actual want; and owing to laxity of supervision, labourers, so called, were in very many cases maintained in idleness. All this Sir Richard Temple, in communication with the Madras Government, was able to rectify. The relief wage was reduced for men from 2 annas (3d.) to 1¼ annas per diem, and that for women and children was lessened proportionately. Admission to relief works was strictly limited to those who were in absolute want, and unworthy recipients were discharged. By these means the numbers maintained on the works were reduced in three months from over a million persons to 716,000.

The number of persons unable to work, and, therefore, in receipt of gratuitous relief, has been, and still is, enormous, amounting, at the end of July, to one million in Bombay and Madras, and to 150,000 in the State of Mysore, and increasing steadily up to the end of September. The figures on the map, which include those employed on relief works, as well as persons gratuitously relieved, give the following totals:—For the end of July—Bombay, 298,675; Madras, 1,984,094; Mysore, 199,634; or in all, nearly two millions and a half. A fortnight ago, with the large diminution which followed the recent rainfall, the numbers were considerably over 2¼ millions. The price of food grains varied in different parts of the country, but generally it may be said that they were from three to nine, and in some places ten times dearer than in ordinary years.

In our number for February 1874 (p. 441) we gave some account of previous visitations, as well as of the principal features of 1874; and in May of the present year (p. 112) we referred to the main principles of famine administration. It will not, however, be out of place to refer briefly to past famines, on the present occasion. The first thing that is apparent is their terrible frequency, and the impartiality with which they visit in turn every part of India. In 1860-61, 25,000 square miles in the North-Western Provinces suffered from the severest drought. In 1866, we had the Orissa famine, during which it is computed that one-fourth of the population died. In 1868 the collection of native states included in Rajputana, was affected over an area of 100,000 square miles. From hunger and disease, no less than one million and a quarter of the inhabitants are said to have died; and in Marwar, a pastoral state, where there were, before the famine commenced, 2,250,000 head of horned cattle, whose united value may be estimated by the fact that a young and unbroken pair realise from 8*l.* to 25*l.*, three-fourths of these perished, and the country was left with one-fourth of the number of cattle required for agricultural purposes. Truly might the

Political Agent write—"The famine will paralyse the energies of the country for years to come, and a long repose will be needed before Marwar will recover the heavy losses to her material prosperity caused by this fearful calamity." In 1874 Bengal suffered. Some notion of the check to the country's progress caused by these frequent famines is gained by statistics furnished by Colonel Baird Smith. In 1837 the North-Western Provinces were affected by drought over about the same area as in 1860. The average annual revenue of the Agra Division before that year was 750,000*l.*; five years after it was 625,000*l.*; ten years later it was 700,000*l.*; and in 1860 it was still only 715,000*l.* The total loss in revenue in this one division during twenty-two years may, therefore, be reckoned at 1,328,500*l.*, representing a loss of agricultural property of not less than 8 to 10½ millions sterling.

It is impossible to realise to the full extent the amount of suffering and financial disaster which have been averted by the last fortnight's rainfall in India. It has come at a time when the deepest gloom was settling upon the country, and when there was every reason to fear not only a recurrence of famine in the portions already afflicted, but a failure of the winter crops generally throughout the whole of India, with the exception of Bengal and Assam. The north-east monsoon was overdue, and little rain had fallen in Northern India. The people of Bombay and Madras would have had to encounter a second year's famine with stocks and capital exhausted, and with the knowledge that the supply of grain which had come to them from Northern India could not be expected to continue. The whole burden of their support, therefore, would have fallen upon the Government of India, and the resources of the Empire would have been taxed to the utmost to accomplish the task. Happily these fears have been set at rest; but the danger we have escaped, no less than the actual experience of the last twelve months, ought to be taken to heart by the Government, who has committed to its keeping the fortunes of 240,000,000 of people. Without attempting to dwell upon the numerous causes which contribute to make drought in India so terrible a scourge, we may well conclude, in the words of Colonel Chesney, that "till the danger of famine has been guarded against to the fullest extent, the English in India may replace anarchy by peace, and may distribute equal justice and remove ignorance, but it cannot be said that they have fulfilled their whole duty by the people of that country."

KWATAH (QUETTA) AND THE AFGHANS.

A SERIES of letters, signed "T.," have lately appeared in *Allen's Indian Mail*, on "Quetta," so-called, which I have read with some interest, particularly No. IV.; and, with your permission, I will say a few words on the same subject, which may tend to remove some misunderstanding and correct some errors.

It is not surprising that the writer of the letter in question has found a map of the boundaries of Afghanistan "in which Quetta and the whole valley of the Shahdezee Lora (Shawl) is included in Afghanistan; indeed, Mustoong is also coloured as belonging to the Afghans." He, doubtless, is aware how the boundaries in Elphinstone's map are coloured. In that map "Quetta" and the "district of Shawl" is included in Afghanistan, together with part of the Dasht-i-Be-Daulat, as far south as Sar-i-Ab; but Mastang is included in Baluchistan. This is not to be wondered at, for more reasons than one. The tract in question *is part of* Afghanistan, and is peopled by Afghan clans of the great tribe of Kakar, while south of Sar-i-Ab, the people are Baluchis.

The chief town of the district of Shal is, correctly, called Kwatah—an Afghan word—with the peculiar Afghan ṭ, which sound is obtained by reverting the point of the tongue to the palate, and is similar to the Sanskrit ṭa. The word signifies "a mound," "a heap," "a pile of earth, stones, or rocks," as given in my Afghan Dictionary; and any one who has ever seen the place, or seen a view of it, must have perceived, at a glance, the appropriateness of the name.

That Shal, or Kwatah, "*has been* included in Afghanistan" is not to be wondered at. The district, as before noticed, is peopled by Afghans; and the true south-eastern half or portion of the boundary of the Afghan country is clearly defined by a range of mountains somewhat in the shape of a bow, with the apex to the south, stretching from Dajal, near the Indus, in the southern Derah-jat, to Sar-i-Ab. All the people north of it are Afghans: all to the south Baluchis.

Elphinstone says—"Shawl is inhabited by a tribe of Caukers called Cassye (Kasi Kakars); but, as it was granted by Ahmed Shauh to Nausser Khaun, the Prince of the Beloches, it is no longer to be considered as a part of the Afghaun country." This is not quite correct: the tract in question was only placed *temporarily* under the control of the Baluch chief by Ahmad Shah, *as a vassal and tributary*, who acknowledged the suzerainty of the Durani Empire; and, up to the downfall of the Sadozi monarchs, that vassalage was observed, and a contingent of Baluch troops was furnished to the Duranis, to the number of 7500 horse and camel sawars, in time of war. The Wazir, Fath Khan, Barakzi, was the last who appears to have coerced the Baluchis for rebellion, when he restored Shah Mahmud to the throne; and when the Sadozis fell, and the Barakzi brothers divided their sovereign's dominions among themselves, the Baluch chiefs seem to have gradually shaken off or weakened the bonds of their Afghan yoke, which the later Barakzis were never after inclined or able to enforce.

The first Nasír (by some called Násir) Khan, Baluch, son of 'Abd-ullah Khan, brother of Mir Muhabbat Khan, who was a hostage in the hands of Nadir Shah, fell into the power of Ahmad Shah on the assassination of Nadir; and the Baluchis, as well as the Hazarahs and Kazilbashis, associated themselves, with the Afghans, in raising Ahmad Shah, Abdali, to the throne of Afghanistan.

In after years, when Humayun Shah was defeated by his brother Shah-i-Zaman near Kal'at-i-Ghalzi, Humayun fled to Nasir Khan for shelter; but the latter hastened to inform Shah-i-Zaman that he had only received Humayun, and treated him honourably, as a member of the suzerain's family; that he would be answerable that Humayun should not commit any

hostile act against the Shah while in his territory; and that he would observe his own loyalty faithfully as he had ever done. Shah-i-Zaman, who trusted to his good faith, made no further demand.

Soon after Nasir Khan died, and his eldest son, Mahmud, being quite a child, a brother's son of Nasir Khan's usurped the chieftainship, and, soon after, began to intrigue with Humayun. Subsequently, Humayun left the Baluch territory, and the Hafiz* Sher Muhammad Khan, the Mukhtar-ud-Daulah, was sent by Shah-i-Zaman with an army to chastise the rebel and reinstate Nasir's son. He defeated the Baluchi rebels in a pitched battle, entered Kal'at-i-Baluch, or Kal'at-i-Brahui, as it is also called, to distinguish it from Kal'at-i-Ghalzi (there is no such place as *Khelat*, I beg to observe, but there is another Kal'at, namely, Kal'at-i-Nadiri, in Khurasan), the young chief was restored, and was taken back to do homage to the Shah, which he did; was received with great favour, and was dismissed with a rich dress of honour; and up to the year 1213 H., A.D. 1798-99, when one of my authorities wrote, this chief, Mahmud Khan, was still living, and was loyal to the Durani monarchy.

The same writer states that the dominion or state of Baluchistan, at that time, extended from the frontier of Sindh to within 15 *kuroh* of the Maskat territory, and from Mastang to the ocean.

Why does the Amir Sher 'Ali Khan, Barakzi, look upon our recent occupation of Kwatah with hostile eye, and as a menace? The answer is contained in another question: Why was the mission under Sir F. Goldsmid, K.C.S.I., appointed to settle disputes between the Persians and Afghans in Sistan, and how were they settled? The Persians claimed Sistan as a province of Iran from ancient times, and asserted that it was only lost during the Afghan conquest of Persia, and that they had very recently reconquered it. The Afghans claimed it as part of the Durani empire by right of Afghan conquest, although Sher 'Ali is but the son of one of the Barakzi brothers, who overthrew the Durani empire and appropriated its States among themselves. Here Sher 'Ali's claims were allowed, and the Persians have had to give up great part of the province of Sistan to the Afghans. Now, if right was on the side of the Afghan ruler in that case, how much more so is it in this?

I have not heard that Sher 'Ali has actually laid claim to Kwatah and its dependencies; but I should imagine that he does lay claim to it, hence the hostile feeling which has arisen on the part of the Afghan Government towards us. Thus, in occupying Kwatah, we have occupied what really does not belong to the Baluch, save and except as long as the Baluch chief acknowledges the Afghan suzerainty, and observes the compact for which that district was assigned—compacts and treaties, however, in these enlightened days, are but waste paper, according to some moralists—and the Afghans, who had begun to forget our former hostility towards them (as was proved when Sher 'Ali, the first independent sovereign of Asia who ever did so, presented himself before a Governor-General of India), will not believe that we have occupied Kwatah as friends, but out of distrust, and as a menace.

* Hafiz here signifies one who knows the whole Kur'an by heart.

As to Kwatah being the key to the Bolan Pass, I have always looked upon that idea as perfectly untenable, when the pass can be turned and avoided in several directions, and India could be reached from the west and north, if that were the object, without touching Kwatah or the Bolan at all. Marw, Balkh, and the little States on the Upper Oxus, are the points to be looked after and guarded from Russian intrigue and aggression.

As to Afghan patriotism, I should imagine we have already had some specimens of it. The gallant 'Usmanli Turks were supposed to possess none either. Whatever feuds may exist among the Afghans themselves, only let foreigners assail them, and they will give them similar specimens of patriotism. The Ghalzis, although hereditary foemen of the Barakzis, were the very tribe which, in the disastrous close of our first Afghan campaign, gave us such infinite trouble. We all know what excellent soldiers the Afghans make, as our Panjab frontier regiments amply show.

Never was there such a time and opportunity lost for making the Afghans fast friends and allies against Russia, and the Muscovite designs in Central Asia. With this object, the Afghans would have joined us, in concert with our old allies the Turks, and may possibly do so still, with judicious treatment, as they, in common with all Musalmans, who look upon the Sultan of Turkey as "the Khalifah and Defender of their Faith, and Guardian of the Holy Places," hate the Russians; and they are farther ready and willing to serve us because we are good paymasters, and, hitherto, have kept faith with them.

Such a combination once on foot between the British and the Afghans, in accord with the Porte, and carried out with energy, Central Asia might speedily be made so hot for the Russians that they would be only too glad to betake themselves off, "bag and baggage," to the cool regions of Siberia again—a move somewhat better than the occupation of Kwatah by us. We might, however, do many things with the Afghans as friends and allies: we might, probably, keep a force at Hirat, at Kandahar, and other places—but not at the capital, Kabul—with their sanction, but not act as we did on the former occasion: we must keep strictly aloof from any political interference in any way whatever.

As to the idea "of severing Herat and Kandahar from the ruler of Kabul" (advocated, I believe, in Sir H. Rawlinson's work on *England and Russia in the East*), "and there being no ethnical or national reason against it," I fancy the theory is far easier put forth than the act would be to carry out, and that the Afghan inhabitants would have a word to say on that subject. What has become of over 300,000 Afghan inhabitants dwelling in Hirat and its dependencies, who are of far more account, in a political point of view, than the Tajziks, the Hazarah Mughals, and the Char-I-mak (the Jamshidjis are included among the latter, but General Ferrier makes Baluchis of them), and others of Turkish descent, although double the number of the Afghans?

It is the custom among the Duranis to employ Tajziks and other conquered races in the cultivation of their lands, and, therefore, those people may be considered generally as were the Helots among the Greeks.

It is quite a mistake to suppose that the Durani Afghans have only held the lands about Kandahar since "Nadir Shah parcelled them out in the middle of the last century." I will briefly relate how the Afghans first got Hirat into their possession, and how they *again* obtained lands in the Kandahar province from Nadir Shah, premising that it is tolerably well known that they obtained permission to do so, in the first place, from Sultan Shah Rukh, in the latter half of the fifteenth century A.D.

Two hundred and eighty-eight years since, in the last month of 1006 H.—A.D. 1589—Sado was chosen chief of the whole of the Abdali tribe, which was most numerous around Kandahar, the different clans of which had, for a long time previously, been governed by their own immediate heads, who were independent of each other. Shah Beg Khan, who was governor of the province of Kandahar, on the part of the Emperor Akbar, confirmed this election; and, at this period, there were just 12,000 Abdali families settled around Kandahar. After a time, in 1032 H., the Sufi of Persia obtained possession of that fortified city and province, and Sado obtained from that monarch the title of "Mir-i-Afghan," and the grant of the town named Shahr-i-Saffa, north-east of Kandahar. Kandahar was subsequently treacherously given up to Shah-i-Jahan, Emperor of Dihli, in 1047 H., by the Persian Governor, but it was afterwards surprised, in 1059 H., by the Persians, and the Dihli rulers never after regained possession of it. At the time of the revolt of Mir Wais, Ghalzi, and the seizure of Kandahar by him and his tribe in 1120 H., he began to act in a hostile manner towards the Abdalis, who had been in league with him against the Persians; and the Abdalis being very numerous and powerful at this time, and the Persians weak, they commenced pushing their way towards Hirat. Asad-ullah Khan, the descendant of Sado, took Hirat, during the absence of his father, 'Abd-ullah Khan, at Multan, on the 15th of Ramazan 1124 H.—the latter part of 1712 A.D. On his return soon after, the father assumed the title of Shah, and took up his residence at Hirat, and the whole Abdali tribe moved thither; for, as previously mentioned, they were not on good terms with the Ghalzis, and hostilities had taken place between them on several occasions.

In 1133 H., the Abdalis again defeated the Persians, and acquired an accession of territory, including, among other places and districts, Ghurian, Badghais, Kausiah, Tun, Tabas, Ka-in, Isfarain, and Farah.

When Nadir Shah invested Hirat in 1144 H., for the second time, the Ghalzis sent a force to aid the Abdalis—another specimen of Afghan patriotism. Nadir allowed Allah-Yar Khan, the head of the Sadozis, who had been deposed by Zu-l-Fikar Khan, to hold Hirat again, subject to certain conditions, but Allah-Yar Khan almost immediately afterwards became hostile, and Hirat was finally taken from him. The Ghalzis had again aided the Abdalis in this affair. Nadir took possession of Hirat, a body of Abdalis was enrolled in his army, and 60,000 Abdali families were removed from thence to lands about the Mashhad-i-Mukaddas Abiward, and as far as Simnan and Nishabur in Persian Khurasan; and cattle were given to them to enable them to cultivate the lands in question.

The Abdalis in Nadir's army, under 'Abd-ul-Ghani Khan, behaved so well at Baghdad, in the campaign against the Turks in 1145 H., that he declared he would grant any request they might make him. The request was that he would release the 500 Abdali families detained as hostages, and restore the Abdalis to their ancient lands about Kandahar when he should take it from the Ghalzis. This, I trow, was some proof of patriotism and love of country, of which virtues I have myself met with many strong proofs in individual instances.

When in 1150 H.—A.D. 1733—Nadir took Kandahar, the Ghalzis were transferred to the tracts in Khurasan, whither the Abdalis had been previously removed from Hirat, and the Abdalis were allowed to return to Kandahar again. Twelve thousand ploughs, to each of which were attached sixty *bigahs* of land, out of the lands of Kandahar and its dependencies, were granted rent free for ever to the Abdalis, but a contingent from that tribe was embodied into Nadir's army as before. Serving with that contingent of his tribe was Ahmad Khan, Abdali, afterwards Ahmad Shah—the Pearl of the Duranis—the founder of the Durani monarchy. The walls of Kandahar were razed, and the new city of Nadirabad was founded.

There are still to this day some 10,000 or 12,000 Hotaki Ghalzis dispersed in various parts of the Persian empire.

Thus, it was not that "the lands were parcelled out in the middle of the last century" for the first time, for the Abdalis had previously held lands therein from the time of Shah Rukh. On the foundation of the Durani monarchy, Hirat, as a matter of course, was again taken possession of, and, with the exception of a short occupation by the Persians very lately, it has ever since remained in possession of the Afghans.

What has happened since this very recent occupation of Kwatah? Two officers of Engineers have already been murdered, and now we hear from the *Dihli Gazette* that "the Gurkah Battalion at Derah are ordered to hold themselves in readiness for immediate service, it is supposed in *Khelat* (Kal'at), owing to recent news from that quarter." We have not yet seen, I fear, the last of this mistaken move.

H. G. RAVERTY, Major,
Bombay Army, Retired.

THE ISLAND OF PERIM.*

THE Island of Perim is situated at the entrance to the Red Sea, in latitude 12° 40′ 30″ N. and longitude 43° 23′ E., being distant from the Arabian coast nearly 1½ miles, and from the African between 9 and 10. The greatest length of the island is nearly 3¼ miles and its average width about 1¼. Its circumference, following the sinuosities of the coast line, would probably exceed thirty miles. Opposite to Perim, on the Arabian side, is Fisherman's or Pilot Rock, a small rocky island, the passage between it and the mainland being studded with a reef of peculiarly sharp rocks exposed at low water. The

* From an account of Perim by Lieutenant J. S. King, of the Bombay Staff Corps, in the *Selections from the Records of the Bombay Government*, No. XLIX, New Series, 1877.

Small Strait, which is the passage usually taken by steamers, lies between Pilot Rock and the S.E. end of Perim, and the *Broad Strait* between the western end of Perim and Ras Sejan on the African coast. In some parts of the Broad Strait there are no soundings except with the deep sea-lead, and in 1876 one end of the broken Red Sea Cable was picked up there in 1000 fathoms.

The harbour (which has many natural advantages) faces the south-west, and is 1¼ miles in length with an entrance 860 yards wide. It is almost surrounded with long ranges of gradually-sloping hills, averaging about 90 feet in height, and so affords safe anchorage for ships in all winds. Behind a headland in the harbour upon which the old fort stands, is the Inner Harbour or Fisherman's Bay. The currents at the ebb and flow of the tides, both in the harbour and straits, are very rapid, and a curious fact connected with them is that the flood tide runs out from the Red Sea and the ebb tide sets in. Small steamers passing through the Narrow Strait with both wind and tide against them have often great difficulty in making any headway at all.

At the south-west of the harbour is a long, low, and narrow tongue of land like a natural pier or breakwater called "The Spit." Towards its extremity it widens a little and rises gradually, terminating abruptly in a rocky bluff about 30 or 40 feet high. On its inner side is a belt of hard conglomerate coral from 20 to 30 feet broad, covered at low tide by only two or three feet of water. If this reef, which is nearly straight on its outer edge, were built up with stone, an excellent pier could be made, alongside which even large ships might be moored to discharge or receive cargoes. This work would be particularly useful if Perim should ever be made a coaling station. To the east of the harbour is False Bay, which at high water might be a good harbour during the prevalence of the northerly wind, as it is enclosed on three sides by hills, but the whole bay is so choked with madrepore as to be unsafe even for small native craft.

Viewed seawards Perim presents the appearance of a long, slightly elevated, table-land, completely covered with dark coloured boulders. The fort and lighthouse stand on the summit of a range of hills 203 feet above the sea, and overlook the Narrow Strait. The lighthouse is enclosed within the walls of the fort at the north-west end, the summit is 241 feet above the sea and in clear weather the light is visible at a distance of 22 miles. The light has four branches, and there is a space of one minute between the flashes, each of which lasts ten seconds. At the end of the fort furthest from the lighthouse are the commanding officer's quarters, a substantial double-storied, flat-roofed house. The European officer in command is supposed to be relieved every two months, with the detachment, which consists of fifty men (including one native officer) of the Native Infantry Regiment stationed at Aden.

Overland postal communication with Aden is carried on by means of camel dawk twice a month. The postman, on the night of his arrival at Bab-el Mandeb, lights a fire, which is seen by the look-out man on the lighthouse. A boat is then sent across, unless the weather is unfavourable, in which case the "exile of Perim" may have to wait two or three days for his letters. A steam launch, fitted as a lifeboat, is much needed, both for the postal service and for succouring ships in distress. There is a signalling staff just outside the fort, by means of which the commanding officer can always communicate by signals with passing ships, but there is no telegraphic communication, though the Red Sea cable passes through the Broad Strait within two miles of the island.

Numerous attempts have been made at different times to excavate for fresh water on the island, but always without success. The drinking water is accordingly condensed, and an inferior quality (called *purchased water*), for bathing, &c., is brought over in *bugalas* from the Arabian and African coasts, that from the latter being the best. There is a commissariat contractor who is bound to keep a three months' supply of each article on the island. Arabs also frequently come across the Strait in canoes, with fresh provisions of all kinds for sale, the prices of which are very moderate. They also sometimes bring the leaves of a shrub called *kát (Catha edulis)*, a drug much used by the Arabs and Somalis as a pleasurable excitant, the leaves and tender shoots being said, when chewed, to produce hilarity of spirits and an agreeable state of wakefulness. Fish are very plentiful; the best kinds for eating being the *surmáhi*, *halwá*, *bui*, pomphlet, sardine, and a kind of red mullet. Whales and immense sun-fish are sometimes seen, even inside the harbour, and sharks and porpoises are very numerous. Turtles are occasionally caught on calm moonlight nights, when they come on shore to lay their eggs in the sand. At Perim as well as Aden, every year, at the change of the monsoon—generally in October or November—immense quantities of fish of all kinds are washed ashore dead. This plague lasts several days, during which every one has to turn out and help in burying the putrid fish. The natives believe that it is caused by the fish eating some poisonous spawn; but, according to Lieutenant King, a more likely cause is the prevalence at that time of electricity in the sea. Snakes, scorpions, and rats are common in the island: penguins, sea-eagles, hawks, kites, parrots, and many kinds of sea-birds are generally to be seen, and quail have been shot on Perim.

The surface soil on many of the level portions of the island, both high and low, being to a great extent saturated with salt, is not very productive; but there is abundance of good limestone soil on the slopes of the hills and in the water-courses. The large flocks of goats belonging to the Somali inhabitants live almost entirely on the leaves of plants and grass, which they find in their wanderings among the hills. A great deal of this grass is of a very coarse description, but Lieutenant King found by experiment that when planted in good soil, and watered regularly, it became much finer. The principal plants and shrubs are senna, statice or sea-lavender, salsola, datura, portulucca, wild mignonette, *bábhul* (gum-Arabic), and *pilu* (*Salvadora Persica*). The latter is supposed to be the mustard tree of Scripture, and is much used by the natives for making their *miswáks*, or tooth-cleaners. An innumerable number of beautiful and curious as well as useful shells are to be found at the neap tides seasons on the shores of the bays, especially in False Bay, and a classified list of the more common of them is given by Lieutenant King.

Among them may be mentioned the *Indacna gigans* which sometimes attains the diameter of 5 feet and a weight of 500 pounds, the flesh alone weighing thirty. The muscular power is said to be so great as to be able to cut through a thick rope on closing the shell. The Republic of Venice presented one of these shells to Francis I., who gave it to the Church of St. Sulpice in Paris, where it is still used as a basin for holy water. The natives of the Molucca Islands are fond of eating the fish, the flesh of one is a sufficient meal for twenty people, and the shells of the clam are occasionally used as feeding trough or baths for children.

As regards its geological features, Perim seems to be a connecting link in the volcanic chain which runs down both shores of the Red Sea, and to owe its origin to a volcanic upheaval, which probably took place about the middle of the Tertiary Epoch. It appears to have since undergone submersion and successive uphevals; and volcanic disturbances in the neighbourhood, which are related to have taken place —for example, in A.D. 1253 and in 1846—no doubt affected Perim also. The successive volcanic upheavals to which the island has been subjected, assisted by the formation of fresh coral reefs, account for the extensive plains on the north side, these being the old sea beds of various bays, which formerly intersected the coast line. The old coral beds are from 10 to 15 feet in thickness, and large masses, which have been undermined by the sea, have fallen in, and, in the course of ages, formed beautiful white sand.

Although the island is of volcanic origin, yet there are outcrops of schist, shale, and limestone, which have been tilted up by the upward pressure of the igneous matter. All the hilly portions of the island are covered with basaltic and trachytic boulders, of every size and shape, but mostly rounded and versicular, and of a black or dark reddish colour. Underneath these lies a layer of volcanic soil, from 2 to 6 feet in depth. The ordinary versicular trachytic boulders, besides being extremely hard and difficult to cut evenly, make bad building stone, on account of their disintegrating tendency, but excellent limestone may be found by digging to a depth of two or three feet on any of the small kunkur hillocks which occur all over the flat summits of the hills. Three different varieties of good building stone are also to be found at Azalea Bay. Lime for building purposes is to be had by burning the coral, or by dredging for lumps in the harbour at low water. There are three or four limekilns, but all firewood having to be imported from Aden or from the African coast, lime is very expensive.

Owing to the general conformation of the shores of the Red Sea, the winds, for the most part, blow in the direction of its axis, being for eight months from the north-west, and for the remainder of the year from the south-east. The north-east monsoon, on entering the Red Sea, is completely deflected, and rushes up the axis of the sea as a south-east wind. At the change of the monsoons the heat is very oppressive, but at other times the strong breeze tempers the heat pleasantly. On the whole, the climate of Perim is remarkably healthy. Roads are much wanted, owing to the quantity of loose boulders and sharp stones with which the island is covered.

The object of our original occupation of Perim in 1799 was to prevent the enemy coming down the Red Sea, but as there is little danger of this happening at the present day, so long as we can hold Egypt and the Suez Canal, an enemy would probably attempt to take Perim from the east, and if they succeeded would completely block up the Red Sea. To prevent this two or three batteries of heavy guns are necessary on the west and south sides, while the straits would be best defended by torpedoes and two turret ships with heavy guns stationed in the harbour and cruising off the south of the island at night to prevent a surprise. Colonel Sir Wm. Jervois, R.E., recommends the construction of a small circular casemated fort with ditches and a glacis, and with iron shields at the embrasures for ten M.L.R. guns, at the extremity of the Spit. The cost of this work, including armament, he estimates at 82,000*l.*

Lieutenant King remarks of this scheme that barracks would have to be built for the 150 men composing the garrison, either at some considerable distance from the fort or in some exposed position close to it. An enemy coming up from the south-east could avoid the fire from the fort, and *might* succeed in planting guns on the heights above False Bay, and so easily command the proposed fort. Lieutenant King suggests instead Murray Point, or the place where the old fort stands as better sites, and points out that with good roads light field pieces might be moved to any commanding position, so as to prevent a landing on the shore. The approaches to the island could only be defended by turret ship and torpedoes.

The earliest mention of Perim is made by Ptolemy, who calls it Perantonomasiam, or extending across to Asia, but the island does not appear to play any part in history till A.D. 575, when the Abyssinians, having conquered Yemen, M'Adi Kárib, son of Saif, the last of the old Himyarite race, obtained from Kasra-an-Noushirwan, the Persian King, a force of 3,600 men, consisting of malefactors in the prisons, and sailed in eight vessels for Aden and El Maiyun, or Perim, from which places they effectually drove out their foes, after which M'Adi Kárib was created Viceroy of Yemen. In 1513 the Portuguese fleet under Don Afonso de Albuquerque entered the Red Sea and touched at Perim on his way to Aden and India, and named it Vera Crux in memory of a very bright red cross which he had descried in the heavens a short time previously. Don Juan de Castro, a captain in the Portuguese fleet, and afterwards Governor-General of Portuguese India, in the journal of his voyage from Goa to the Straits of Bab-el Mandeb in 1540, gives a tolerably correct account of Perim. Sir Henry Middleton, commander of one of the expeditions sent out by the English East India Company, passed through the Narrow Strait on the 14th November 1610, on his way to Mocha, and describes Perim as "a low flat island." Two years later, Captain John Saris, of the 'Clove,' under the orders of Sir H. Middleton, passed through the Broad Strait on his way to Mocha. The mouth of the Red Sea was at one time much infested by pirates, who amassed considerable booty by plundering the native vessels engaged in the Indian trade. In 1695, under the leadership of Captain Evory, they established themselves on Perim, and commenced building regular fortifications and digging for water, but, being unsuc-

cessful in this, they abandoned the design and removed to St. Mary's Island on the east side of Madagascar.

In 1799, during the war with the French in Egypt, Perim was occupied by a British force, in order to prevent the French coming down the Red Sea and attacking our Indian possessions. This force, called the Red Sea detachment, consisted in all of about 300 European and native troops, and was commanded by Lieutenant-Colonel J. Murray, R.E., who was appointed Political Commissioner for the Red Sea. He arrived in Perim Harbour on the 3rd May 1799, and on the same evening took formal possession of the island in the name of the East India Company. A few days afterwards a naval force, under the command of Commodore Blankett, arrived from Great Britain with orders to assist Colonel Murray in holding the entrance to the Red Sea. The detachment had not been long on the island before the want of water began to be felt, and though every effort was made to procure water on the island, it proved unsuccessful, and on the 8th September Colonel Murray withdrew the greater portion of his troops to Aden. Numerous traces of Murray's occupation still remain on the island, including a ruined circular tank, intended to hold 25,000 gallons.

During the year 1855 a good deal of correspondence passed between General Coghlan, then Political Resident at Aden, and the Government of Bombay relative to the erection of a lighthouse at Perim, and in the following year Sir Henry Leeke, Commander-in-Chief of the Indian Navy, strongly recommended that this step should be taken, and that Perim should be occupied by us for the purpose. In the course of his letter he pointed out that this island was the key to the Red Sea, and that in the event of a war it might form a place of resort for privateers. "Again (he continued), in the event of a ship canal being cut between Suez and Alexandria, the value of such an island to the interests of trade is very apparent and of the utmost importance to England and India." Sir Henry added a significant postcript to the end of his letter, stating that he had just heard that a French engineer* was about to survey Perim and the islands in the Red Sea. This intelligence induced the Government to pass a resolution in the Secret Department on the 10th November 1856, directing the immediate occupation of Perim. Lieutenant Greig, R.E., Assistant-Engineer at Aden, with a detachment of Sappers and Miners left Aden for Perim in the H.E.I.C schooner 'Múhi' on the night of the 13th January 1857, and on arriving there built a defensible barrack or block-house. He also made an accurate plan on the scale of 500 feet to an inch, but a fresh one, with contours 12½ feet apart is much needed. Lieutenant King, from whose description our article is borrowed, spent eleven months on the island and fully explored every part of it.

* This was M. Lambart, agent of the firm of Menon, Lambart, and Co., of Bombay and Mauritius. He had during the past twelve months visited and surveyed Perim and did not hesitate to state that he had recommended the French Government to occupy it.

A DESCRIPTION OF THE ISLAND OF FORMOSA.

WITH SOME REMARKS ON ITS PAST HISTORY, ITS PRESENT CONDITION, AND ITS FUTURE PROSPECTS.

(Continued from page 266 of our last number).

THE one common characteristic of all the villages (a characteristic from which, unfortunately, the cities are not free) is dirtiness. It is hard to say whether the inside or outside of the houses is worst. As in other parts of China, the night soil is collected in pits, public latrines being erected at various places. These, however, are never cleared out, the tubs for the fields being filled as required, and the whole neighbourhood of one of these pestilential holes is a mass of festering putrefaction. Tubs are also placed in the streets and courtyards, with very little regard to decency.

At most of the villages there are one or two inns. The sleeping rooms are generally 10 or 12 feet square, and contain two beds. The beds are of bamboo, and are fixtures. Fortunately, the only bedding is a mat. Sometimes there is a hole through the wall—more than half filled with wooden bars—which does duty as a window; but the rooms are invariably so dark that a lamp is required even during the day. The lamp consists of a small cup of oil, with the pith of a rush projecting a short distance over the edge. The lamp gives a great deal of smell, and enough light to smoke by.

The inhabitants have no idea of the advantage of fresh air. On one occasion, in company with Mr. Elles, I entered one of these rooms in Ung Kang Bey. The entrance was through a cooking and eating room, into a court partially roofed over, and filled with refuse and filth of the most disgusting description. The door of the bedroom opened into this court, and the window consisted of one tile replaced by a few pieces of oyster-shell. The room being oppressively close, I tried to explain to the proprietor that I would like some air, and suggested removing some tiles. After some time, an idea seemed to strike him, and, mounting on a stool, he pulled aside one tile that was made to slide. From his delighted air, and from the way in which he kept pointing at it, and ejaculating "Haw! haw!" I came to the conclusion that this was a unique contrivance, and was probably used for the first time. The size of the opening was 5 inches by 3.

The want of a good road ought to be severely felt, but I doubt if many of the inhabitants really think that anything better than the present road is required. The main road from north to south varies from 3 to 8 feet in width, where it is visible: in some places it is lost in a maze of paths. In the northern part of the island it is paved with round water-worn stones, driven in so as to form a causeway; and near Kagee it is paved with flat stones, about a couple of feet wide. In many places, however, it is merely a mud track, almost impassable in bad weather. Near Taiwan-fu, and also near Teukcham, bullock carts are used. As a rule, these can be used, not in the districts where the roads are good, but in the districts where the land is poor and there is little cultivation, and, consequently, the carts can leave the track in bad weather. There is no road on the island suffi-

ciently good to sustain regular cart traffic at all seasons.

The country which has just been described is the flat and civilised portion of the island. The hilly and uncivilised portion is of quite a different character. The west coast of the island is so low that it can hardly be seen at a distance of 3 or 4 miles, and houses and trees near the coast are liable to be mistaken for junks at a very slight distance. The east coast, on the other hand, is generally mountainous, with deep water very close to the shore. A ridge of mountains runs up the centre of the island. Mount Morrison, the highest of the range, is said to be 12,850 feet, and Mount Sylvia 11,300 feet. Mount Morrison is not named after the well-known missionary and Chinese scholar, but after the captain of one of the early vessels trading to Taiwan-fu.

All the land east of the mountains is supposed to be hilly, and inhabited by savages.

About 20 miles to the east of Chang-hwa there is a valley called Posia. This valley contains thirty-two villages, inhabited by semi-civilised savages. No foreigner resides there, but there is a branch of the Presbyterian mission, and the place is regularly visited by the foreign missionaries. Besides them, a few foreigners have penetrated there from time to time. Until lately the road to Posia was very bad, but it has recently been much improved. From Ta-niau, a village 6 miles north of Kagee, a tolerable path leads eastward to Chip-chip. A road from this point to Posia was commenced by the Chinese in 1876, and completed early in 1877. This road runs along the side of the hills, and is made by cutting a narrow path out of the slope, and using the material to increase the width by embankment. Before the road was finished, the southern portion was much injured by rains, the embankment in many places being entirely washed away. The road passes near a lake, which is about 3000 feet above sea level. The borders of the lake are inhabited by a small tribe called Shwui-hwans, or water savages. The hills round Posia are carefully cultivated in terraces. Millet is largely grown, also a fine quality of hemp used for making grass cloth.

For some time the Chinese have had military stationed on the borders of the savage country, trying to open up communication with the east coast. Sau-o Bay, on the east coast, and all to the north of it, have been in Chinese hands for many years. South of it, there are two Chinese settlements, called Sin-cheng and Khe-lai. The most northerly has been in existence twenty years, but has never numbered more than a hundred Chinese. In Khe-lai, on the other hand, there are about 700 Chinese and about 1000 semi-civilised savages.

In 1875, the military constructed a road running along the coast for about 60 miles south from Sau-o Bay, and passing through these settlements. Early in 1877 it was reported that the military from Chip-chip had constructed a road to meet them, and had effected a junction.

The people who inhabit the two parts of the island differ as much in their characteristics as do the two portions of country. The inhabitants of all the level country are Chinese. They have come from all parts of China, but principally from the Fokien province. The colloquial language closely resembles, or, indeed, is almost identical with that of Amoy. The separate clans of Chinese were at one time almost as hostile to each other as to the aborigines, but they are now on much better terms, and to the foreigner the Chinese appear to be divided into two classes only, viz., the ordinary Chinese and the Hakkas. The Hakkas emigrated from the province of Kwang-tung some years ago. A great many are to be found inhabiting the villages in the south of the island. Ten or fifteen years ago these people lived entirely by plunder, and at the time the ports were first opened it was as much as a foreigner's life was worth to pass a night in one of their villages. They are a hardy race, and if they do not settle down to quiet industrial occupations so readily as the other Chinese, they have more daring, and are much more enterprising. In many parts of the island they are to be found acting as go-betweens with the savages. In going north by the main road from Taiwan-fu, they are first met with about Tong-siau, some 12 miles north of Tyka. From this point they are met with at intervals right up to the north of the island. There is a large settlement of them at Tokoham, where they are engaged in the preparation of camphor. There is a great contrast between the Hakka women and their Chinese sisters. The Hakkas never contract the feet, and consequently can walk well. As a result they have sometimes to do hard work in the way of carrying heavy bundles which no other Chinese woman could lift, or at least walk with; but in spite of this they have always a cheerful expression. They are well made, and in many cases handsome. They wear loose trousers, and walk with bare feet. The Chinese women are not unkindly treated, and the compression of the feet does not seem to have any evil effect, but it tends to make them helpless and unable to take proper exercise, and consequently they have often a sickly appearance.

In culture and general intelligence, the Chinese people of Formosa seem to be on a par with those on the mainland. The fact that wages are 20 per cent. higher than in Amoy is a proof that there is no lack of money in the island, though the fact of opium representing two-thirds of the value of all their foreign imports show that they do not make the best possible use of their wealth.

In speaking of distances they use the words *li* and *pau*, the latter being roughly about 10 *li*. As in other parts of China where foreigners have settled, a *li* is generally understood to mean one-third of an English mile. I believe, however, it corresponds better to such an expression as "a five minutes' walk," and did not originally represent a certain length. Mr. Baber says that in Szechuen he found places where the distance from A to B was 20 *li*, but from B to A 40 *li*. On questioning some people he was told that as it was up hill in one direction it would not be fair to the coolies if the length were stated the same in both directions. He suggested that the coolies sometimes had to work by night or in bad weather, but was met by the answer, "O! that is arranged for in the price." The best definition I can give of a *li* is the distance a coolie will walk with a burden in six minutes. A *pau* appears to mean the distance the chair coolies carry without setting down the chair. It is about fifty minutes or an hour's walk. Europeans are, how-

ever, impressing on the people the necessity of having clear measures of distance.

The laxity which prevails in civilised countries regarding weights has had its effect in inducing foreigners to submit quietly to the Chinese practices in this particular. A *picul* of camphor is expected to weigh far more than 100 *catties*. Sometimes as many as 150 are demanded. This is supposed to be an allowance for the loss in pressing or on the voyage. If asked how difference of quality was allowed for, the merchant would no doubt complacently answer, "O! that is arranged for in the price." The standard *picul*, by which every thing should be weighed, consists of 100 *catties* of $1\frac{1}{3}$ lb. avoirdupois, or $133\frac{1}{3}$ lbs.

In the matter of sawing wood they follow the plan of sawing on a horizontal plane; at least, I saw this system followed at Taiwan-fu, and I did not notice any other system in use in any other part of the island. This matter is worthy of notice. All over China the usual saw is a framed saw. The teeth are formed, not, as in our saws, to cut all in one direction, but one half of the teeth cut in one direction and the other half in the other direction, the change being made in the middle. The half of the saw farthest from the sawyer cuts when he is pushing, and the half nearest when he is pulling. In different parts of China the saw is used in different ways. In Shanghai, when a log has to be sawn, one end is raised from the ground and a trestle is placed under it near the middle, the lower end of the log being sometimes weighted. The sawing is commenced at the raised end, the saw being used as in the ordinary English saw pit, with this exception, that instead of being placed in the centre of a frame it is placed at one side, like the small saws used at home by cabinet-makers. When the saw draught has reached the middle of the log, the other end is raised, and a draught is carried to meet the first. I have had logs nearly 70 feet long sawn in this way with a saw not more than 3 inches wide. The work is, as one might suppose, indifferently done, the saw draught being always more or less twisted.

In Chefoo the same description of saw is used, but the log is laid on two trestles, and the saw draught is in a *horizontal* plane, the men standing or squatting one on each side. The log, when small, has to be fastened by ropes or by heavy weights laid on it.

In Tientsin, a large quantity of timber is imported in round logs 10 or 12 feet long and 4 feet or more in diameter. These logs are set up on end, the men mount on stages and saw in a vertical plane from top to bottom. When the log is too small or too light to stand in this way it is fastened up, sometimes not without difficulty. This method is capable of giving fair results, and is used for small pieces of wood in the shops in Shanghai, Canton, and other places. The sawing of large logs by this method is, as far as my observation has gone, confined to Tientsin. In Pekin I have seen the Chefoo method used, and, as above remarked, I have seen it in Formosa. It has one peculiarity which may recommend it to a republican mind—both men are equal, there is no "top sawyer."

Opium-smoking prevails to an extraordinary extent in Formosa; but, as far as one could judge from a short visit, there is not a great amount of smoking to excess. In travelling through the country, my chair coolies always smoked opium at night, and continued smoking after I had gone to bed; yet they were always ready to start before six o'clock in the morning, and seemed fresh. Any such coolie will carry 20 miles a day for ten consecutive days. Smoking in this way costs from 10 to 15 cents per day, and, when a man's wages are only 20 cents a day, opium-smoking soon means ruin; but the chair coolies get at least 75 cents when employed all day carrying, and, therefore, can afford it.

Of the savage inhabitants very little is known. Shipwrecked sailors who have lived among them have given some account of their life in captivity, but this is the only available source of information. Of the semi-civilised savages, however, we have accounts from missionaries and others who have visited them. These semi-civilised tribes go by the name of Pepohwans in the south of the island, Sekhwans in the centre, and Paktowhwans in the north; but these distinctions are seldom adhered to, and all over Formosa they are known by the name of Pepohwans. The Chinese appoint a head man for each village or district inhabited by these people, and he settles disputes according to his judgment; but there appears to be no law. Of late years the savages have been tolerably peaceable, and have carried on a considerable bartering trade with the Chinese; but, quite recently, an edict has been issued forbidding the sale to the savages of guns, powder, or lead. The sale is still going on surreptitiously; but, if it is entirely stopped, there is likely to be some trouble.

The savage women do some handsome embroidery. They are very fond of pieces of coloured cloth, which they pull to pieces, using the threads for this work. They also unravel coloured cloth—by preference, red, green, and orange—and weave or plait the threads into tri-coloured bands for turbans.

Formosa is the seat of two Presbyterian Missions, one connected with the English Presbyterian Church, and the other with the Canadian Church. The English Mission has its head-quarters at Taiwan-fu. The Rev. Dr. Dickson and the Rev. W. Campbell are stationed there. Both of these gentlemen have travelled over much of the island where no other foreigners have penetrated. Mr. Campbell was the first, or one of the first, to enter Posia. Dr. Dickson is a medical missionary, and he has established hospitals at Takao and Taiwan-fu, which are much appreciated by the Chinese. He is often asked by soldiers to prescribe for them, and has offered to attend a military hospital if the authorities will build one, but nothing has yet been done. The Canadian Mission is under the charge of Dr. Mackay. This gentleman lives near Banka, in the north of the island, and is on extremely good terms with all the Chinese authorities there.

The usual mode of travelling in Formosa is by chair. Ponies may be used for riding short distances, but the numerous rivers, too deep to ford and too rapid to swim, render them useless for long journeys, many of the frail rafts or boats which are not very unsafe with one or two chairs being quite unsuited for ponies. The Formosan chair is very light, and may be comfortable for a Chinaman. It is 40 inches long, 48 inches high in the centre, and 40 inches at the sides, and 21 inches wide inside, with a seat about 10 inches high. These dimensions are enough to

show that there is not much room for an ordinary-sized Englishman to move about; still, with the aid of a thick Chinese blanket, the chair can be made tolerably comfortable. The method of carrrying is simply diabolical. Four men carry, two being placed at the ends of the poles, and two close to the chair, one in front and one behind, the two latter supporting the chair by means of cross pieces or yokes passing over the shoulders and attached to the poles by ropes. These ropes are so adjusted that when the men stand still and the chair is loaded, the poles are bent about 3 inches. In carrying, the easy swing of the ordinary chair is lost, for just as the Formosan chair is coming down gently, it is brought up sharp by the men close to it. The motion is exactly the same as is used for jigging crushed metallic ores.

The chairs in Canton are carried in somewhat the same manner, but the poles are better, and the motion is not nearly so disagreeable. The proper method of carrying by four men, with balance bars, as used in Hongkong and in many parts of China, is unknown in Formosa, except in the case of the chairs of a few customs officials. Chinese are sometimes carried by two men, but no foreigner can induce the natives to carry him in that way, even if he offers to provide relays. For short distances three men are employed. This is somewhat worse than four. It is true that, after some practice, one gets accustomed to the motion, and can read and, I believe, sleep; but at first it is very trying.

Foreigners, as a rule, walk a great deal—say, half the day or more—when travelling; but it is necessary, or, at all events, convenient, to have a chair for crossing the shallow rivers. Twenty miles is a fair day's journey, if the men carry all day; but 25, or, at a push, 30 miles may be done, if the traveller walks much. It is only in rare cases, however, that a foreign traveller wishes to go so fast.

In travelling through the civilised part of the island, it is a good thing to take a proper supply of provisions. Carrying coolies can easily be obtained, and no advantage is to be derived from going badly provided, except the advantage of being more than usually uncomfortable. Coolies can be engaged at a cost to the traveller of about $1 for each per day. Having decided how many coolies will be required, the best plan is to make a bargain with a head man for the whole journey. He will then go through the whole way, changing coolies, if necessary, at the villages on the road; but this does not affect the contract. Fowls, eggs, and sometimes fish can be obtained on the road; but bread, tinned meat, cheese, spirits, &c., must be carried. Two coolies can easily carry provisions for two travellers for a week or ten days.

It is true that a person who has been long resident in the country, and who knows the language, may see more if he travels alone, and may learn something of the ordinary home life of the Chinese, from which the traveller with his string of coolies would be entirely shut out, and he will, moreover, effect a considerable saving in expense; but the ordinary foreign traveller would, probably, see less if unattended than if he had the usual retinue, and the saving of expense would be small compared with the total cost of a journey to the island. A boy acquainted with the language should accompany the party, and should have a chair. He will then be able to cook and serve up meals. It must, of course, be understood that these remarks refer only to the civilised portion of the island. When the traveller makes up his mind to enter the borders of the savage country, he must cut down his baggage to the smallest possible dimensions, and, if he carries provisions, should only carry a small supply to guard against emergencies, and not for general use. And here it may be well to speak of carrying a revolver or other weapon. In a country where a traveller is likely to be attacked by brigands or robbers, a stout heart and a good revolver may carry him safely through many difficulties; and in the savage part of Formosa, as in all savage countries, a certain amount of respect will be given to any one who goes about evidently prepared to fight for his rights. In the civilised part of Formosa, however, or in any part of China where there is a fair amount of civilisation, a revolver is worse than useless. If any serious difficulty arises, it will be with the population in general, or with large numbers of them, and against such odds fire-arms must be not only useless, but dangerous. In the first place, if used rashly, it may cause a petty squabble to assume serious proportions, in which case lives may be lost, that of the traveller included. In the second place, people are more ready to resort to violent measures with a man who carries a weapon that at any moment may be used to wound or kill, than with a man who is wholly unarmed. I have carried a revolver for weeks on the borders of Greece, sleeping with it under my pillow at night; and I have travelled without one in many places, including Formosa (though I took one to the island), and the more I see and hear of travelling in thickly-populated countries, the more I think arms of any sort unnecessary encumbrances.

I am by no means of those who say that in all cases of a squabble between foreigners and Chinese the former are to blame; still a foreigner may often take offence where none is intended, and so unwittingly give rise to disputes. The extreme curiosity of the Chinese is very trying. They crowd round one, and take special notice of every movement. One cannot blow one's nose, or make an entry in one's note-book, without giving a subject of conversation to scores of spectators. At meals they will crowd round one out of doors until one can hardly breathe, and indoors they will crowd into the room, or, if it be possible to keep them out of that, they will apply their eyes to every crack and crevice, of which there are sure to be plenty. No one who has not experienced the annoyance of this knows how trying it is. The first time the novelty of the scene may somewhat amuse, and possibly, after years of experience, one may become hardened. On this latter point, I can only say eighteen months has not been long enough to harden me. I know by experience that it is possible to control one's temper, so as to avoid striking; but if any traveller were to strike a native under such circumstances, I should be far from saying there were no extenuating circumstances; and yet, if trouble ensued, it would be necessary to treat the case as one in which the foreigner was in fault, for a hundred chances to one the native had not the slightest idea he was even being rude.

JAMES MORRISON.

(To be continued.)

THE SWEDISH ARCTIC EXPEDITION OF 1878.

[WE have received the following particulars concerning the intended Swedish Arctic Expedition of 1878, from Captain Palander, the gallant officer who commanded the 'Polhem,' and wintered on the north coast of Spitzbergen in 1872-73.]

The object of the Expedition is to make progress from Novaya Zemlya eastward, trying to force a passage along the coast of Siberia, and returning home through Behring Strait, and by the Suez Canal, thus sailing round Asia and Europe.

The cost of the Expedition will be defrayed partly (provisions and wages) by the Swedish Government, and partly by the King of Sweden; Oscar Dickson, Esq., of Gothenburg; and a Russian gentleman, Mr. Siberiakoff.

The whaling steamer 'Vega' has been bought for the Expedition, and no other vessel will take part in it. The 'Vega' is a very strong ship, built of oak, and doubled outside with 4 inches greenheart, is barque-rigged, has a 60 H.P. engine, coals, sparing machine, and can load, inclusive of bunkers, about 500 tons. She will carry as much coal as to steam about 8000 nautical miles. The vessel will be thoroughly overhauled before sailing as regards the hull, engine, rigging, and sails, at one of H.M. Navy stations.

The 'Vega' will be provided with two to three years' provisions, inclusive of preserved food, of which there will be abundance, especially of the kinds that are, or are supposed to be, anti-scorbutic. A small steam launch is being built, which is to be used for soundings ahead of the steamer, while proceeding along the Siberian coast, where the water is supposed to be in many instances very shallow. The launch will also be used for river excursions.

The members of the Expedition will be—Professor Nordenskiöld, as chief; Louis Palander, as captain of the 'Vega'; two mates, a surgeon, and three or four scientific men. As surgeon a person will be selected who, besides his professional qualifications, will be able to co-operate with the scientific men in their zoological, botanical, and other researches. The whole complement of the Expedition will be, in all, about thirty persons. The crew will consist exclusively of naval seamen, with the exception of a few whalers, the former to be chosen from those who have volunteered to go. No one will be allowed to join who does not enjoy good health. It is not considered desirable to take seamen who have already passed winters in the Arctic seas, because such men, in my opinion, are more liable to catch scurvy than others.

The Expedition will sail from Gothenburg about the 1st July 1878 for a Norwegian port, Tromsö or Hammarfest, where the bunkers will be refilled. From thence we shall shape our course for Matotschin Shar, in Novaya Zemlya, where we shall watch for a favourable opportunity to cross the Kara Sea. We shall then call at Dickson Harbour, situated at the mouth of Yenisei River, which place we expect to reach in the beginning of August. The Expedition will then continue its progress to the north-east with as little delay as possible, in the channel which the water from the rivers Ob and Yenisei will doubtless keep open along the coast, at least as far as Cape Chelyuskin. If possible, we shall in the meantime make a tack to the north, with the object of seeing if there is any land between the northern part of Novaya Zemlya and Siberia.

At Cape Chelyuskin the Expedition will arrive at the only place on the projected route where no craft has navigated before, and this, on the whole, is considered to be the most difficult point to pass along the whole North-East Passage.

As Prontschischeff, in 1736, got within a few miles of this cape, in very primitive small river crafts, it is anticipated that our ship, fitted out with all the latest improvements, will be able to pass, and we even hope that there is a probability of our reaching Behring Sound by the end of September.

It is desirable, if time and ice permit, to run to the north, with the object of ascertaining whether any land can be discovered between Cape Chelyuskin and New Siberia, as well as between the latter islands and Wrangel Land.

From Behring Sound the expedition will first proceed, after as little delay as circumstances will permit, to some Asiatic port, whence news can be sent home, and will afterwards continue the voyage round Asia to Suez.

Should the Expedition be hindered from forcing its way farther east than Cape Chelyuskin, it must depend upon circumstances, which are difficult to foresee, whether it will return direct to Europe—in which case the ship, as fitted out and manned, can be immediately used for some other object—or whether it should winter at a suitable port in Tajnums Pjäsinas, or in some bay at the mouth of the Yenisei.

On the other hand, if the sea east of Cape Chelyuskin is found to be blocked by ice, then a suitable port must be chosen for wintering on the north coast of Siberia, whence during the following summer, opportunities may offer for valuable investigations in the Polar Sea north of Siberia, and during the latter part of the summer some favourable opportunity will probably occur, when south winds have driven the ice from the coast, of reaching Behring Sound.

In all probability, if it is necessary to winter on the Siberian coast, opportunities will offer for sending letters home.

As a matter of course, this Expedition, like all other enterprises of the kind, is exposed to many accidents difficult to foresee, and the consequences of which it is impossible to calculate.

It is quite within the range of possibility that the Expedition, in its infancy, may meet with a check so serious as to prevent us from carrying out the proposed programme with the necessary vigour. But if nothing of the sort should happen, and the Expedition is spared from sickness, shipwreck, and other unforeseen calamities, it ought, in accordance with the above plans, and independent of the difficulties of ice navigation in the almost unknown seas which it is intended to search, to return with valuable results. These results will not only be of great importance as a fresh contribution to our knowledge of the globe, of its geography, geological history; of its animal and vegetable life; and of practical use in extending navigation in the Arctic seas; but they will also be of practical value, as giving a correct explanation of several of the phenomena of nature in our own country.

LOUIS PALANDER.

Reviews.

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THE TRANSVAAL.*

THE publication of Mr. Silver's handbook supplies us with much well-arranged information respecting the late Transvaal Republic, while Mr. Campbell-Johnston's able pamphlet enables us to perceive that there are two sides to the question of annexation.

The Transvaal is the most northern of all the European settlements in South Africa, its southern limit being 700 miles from Cape Town. It extends from the Vaal, a tributary of the Orange River, across the tropic of Capricorn, to the banks of the Limpopo, a distance of 400 miles, and lies on the eastern side of the continent, with the Kalahari Desert on its western border. The Transvaal has an area of about 120,000 square miles, and is a tableland, upwards of 3000 feet above the sea, with the Drakenberg on its eastern border, throwing up peaks to a height of 7500 feet. From east to west the plateau is traversed by three mountain ridges, the sources of numerous rivers. Dr. Mann describes the plateau as a shallow basin, surrounded by an elevated rim, which rises to heights varying from 5000 to 10,000 feet above the sea. This rim conforms to the general line of the sea coast, at a distance of 100 to 300 miles from it, but towards the equator it turns inland, and forms the southern water-parting of the Zambesi. The rim then turns obliquely southwards, between the 30th and 25th meridians, and, crossing the channel of the Orange River, finally strikes the coast range of the Stormberg, and so surrounds an oval, saucer-like space, nearly 1000 miles long by 400. The interior of the basin is drained by the Orange and its tributary, the Vaal, and by the Limpopo. These rivers have to break through the rim of the basin in order to convey their waters to the ocean, the one on the western and the other on the eastern side.

The Transvaal is divided into three districts, the *Hooge Veld* (High Country), the *Banken Veld* (Terrace Country), and the *Bush Veld* (Bush Country). The High Country begins at the Vaal, and extends northwards, over a third of the whole land, a magnificent upland, having an elevation of from 4000 to 7000 feet, generally well watered, with a healthy climate. It includes the Lydenburg district, specially adapted for the growth of wheat. The Terrace Country lies along the mountain slopes of the Drakenberg, and consists of broken hills and deep gorges, well watered and wooded. The Bush Country is to the north and north-east, and extends over more than half the Transvaal, filling the area formed by the sweep of the Limpopo.

The Drakenberg Range begins in Cape Colony, and, skirting Natal, traverses the eastern side of the Transvaal from south to north, its length within the province being 400, and its width from 40 to 80 miles. The loftiest measured peak, called Mauchberg after the German traveller, is 7177 feet above the sea. The Libomba Mountains form part of the eastern boundary of the Transvaal, towards the Limpopo, intervening between the Drakenberg and the sea. The Zoutpansberg and Blauberg traverse the northern districts near the Limpopo, the highest point rising to 4000 feet.

The story of the occupation of Transvaal by the Dutch colonists of the Cape has not yet been worthily told. They were driven from their homes by English misgovernment and oppression. In 1796 we seized Cape Colony, and found a thriving and industrious body of Dutch farmers settled in the interior. The first oppressive act was the appointment of a "Commission of Circuit," to inquire into false accusations that the settlers had murdered some of the natives. Nearly every respectable family had these charges brought against one or more of its members. Not a single case was proved, but the settlers were subjected to excessive costs, and a bitter feeling of hostility was engendered. In 1815 another "Commission of Circuit" was appointed: there was a rising, followed by cruel executions at a place called "Slachter's Nek," which were never forgotten. The Government had, in 1801, issued paper rix dollars worth 4s. In 1825 the Colonial Office ordered British silver money to be legal tender in exchange for Cape paper rix dollars at 1s. 6d. This amounted to a confiscation of more than half the property of the people. From 1817 to 1824 the savage Kaffirs were allowed to devastate the homes of the frontier farmers, plunder their property, and burn their houses. The Government would give neither succour nor protection. At last a war broke out in 1834, when 450 houses were burnt down, 100,000 head of cattle and 150,000 sheep stolen, and many settlers massacred. Then Sir Benjamin Durban was at the head of affairs, "the best Governor the Cape ever had." He conducted the Kaffir war in person with great vigour, and Sir Harry Smith swept Kaffraria, and drove the savages across the Kei. But the vigorous and sagacious policy of Sir Benjamin Durban was reversed by Lord Glenelg, who sided with the savage Kaffirs in his despatch dated December 28th, 1834, and brought them back again to the frontier. The Boers had submitted patiently to false accusations, confiscation, and the absence of protection from robbery. But now they saw plainly that their English rulers intended to keep their lives and properties in permanent danger, and to withhold all protection. The foreign yoke had become too heavy for them to bear.

The Dutch settlers resolved to leave the homes of their fathers and wander northwards into the wilderness in search of freedom. They did not rebel, they simply left the country, submitting to poverty, and facing unknown hardships and dangers rather than remain under the oppressive rule of their conquerors. They took with them what they could carry in their wagons, gathered together old and young, women and children, and crossed the Orange River in 1836.

About 8,000 souls joined in the pilgrimage. Neighbours went together, electing for their leader the best man they knew. On reaching the Vaal River they encountered the fierce Matabeli savages under their chief Moselekatze, who suddenly attacked the advanced parties, killed thirty and carried off some of the children. The Boers were taken by surprise.

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* *S. W. Silver and Co.'s Handbook to the Transvaal: British South Africa: Its Natural Features, Industries, Population, and Gold Fields* (1877), pp. 125.

South Africa: Its Difficulties and Present State, suggested by a Recent Visit to that Country. By A. R. Campbell-Johnston, F.R.S. (1877), pp. 68.

South Africa: Past and Present. By John Noble.

But in October 1836, when again attacked, they were prepared. Turning their wagons into a fortification, with their wives and little ones within, they repulsed the Matabeli, their long elephant guns proving more deadly than the assegais of the savages. But all their live stock was carried off, and it became evident that safety lay in taking the initiative. Accordingly it was resolved to form a body of a hundred mounted marksmen, trained to ride up swiftly to the fore, dismount, deliver fire, and gallop back to a safe distance for reloading. These picked men were to advance upon the enemy in his own territory and give him battle; and they were accompanied by a contingent of friendly natives. In January 1837, Maritz and Potgieter led this little force to attack the stronghold of a Zulu chief. The savages fled, leaving to the victors a multitude of cattle. Then the main bodies advanced, forming themselves into law-abiding little communities, and establishing relations with friendly natives.

At length they came to a pass in the Drakenberg mountains which led them down to the rich country of Natal, where they resolved to settle. Negotiations were entered into with a chief named Dingaan, who claimed the territory, and Peter Retief, one of the leaders of the Boers, with a considerable following, went to his capital to arrange a purchase. When all was settled, the treacherous savage massacred the whole of his guests. He then suddenly attacked the main body of the Boers, with their wives and children, during the night. There was a horrible massacre, and the site of the disaster is called "Weenen"—weeping—to this day.

Then three Dutch leaders, named Uys, Maritz, and Potgieter, mustered 800 men, and marched against Dingaan, but were defeated with much loss. In the retreat, Uys and his son, a lad of about fourteen, with a few others, kept together. The father was mortally wounded, and, feeling death approaching, he asked to be laid on the ground. His companions at last left him, but not before they saw that to remain longer on the spot would be certain death. After galloping a short distance, the younger Uys, on looking back, saw the enemy closing in numbers upon his dying father. This was too much for the feelings of the lad; he turned round his horse, and alone rushing upon the enemy, shot three Zulus, and was killed. The apologists of the annexation policy ask us to believe that the countrymen of young Uys are cowards!

Surrounded by these dangers, the heroic emigrants never lost heart. The women cheered on their husbands and brothers to endure, and to obtain success by deserving it. A famous man of their class, a farmer named Andries Pretorius, now became their leader. As before, they advanced with scouts in front, and every night the wagons were placed together so as to form a square. Pretorius led 600 picked men, and they made a vow to the Most High that wherever it pleased Him to grant a victory, there they would raise a house to His honour. The victory was theirs; and the Dutch church of Pietermaritzburg is the fulfilment of the vow. Dingaan was at last utterly defeated. The Zulus delivered assault after assault against the wall of wagons. Their army was 10,000 strong, and at last the ammunition of the Boers was exhausted. Then the gates of the camp were thrown open, and the 600 gallant Dutchmen rode furiously in amongst the 10,000 assailants. The victory was completed, and another crowning triumph followed in January 1840.

Justice ought to have prevented the English from further molesting these long-suffering and heroic wanderers. But it was not so. The Governor at the Cape, Sir George Napier, declared their occupation of Natal to be "unwarrantable," and troops were sent against them. But there was vacillation in the misdoing, and the troops were withdrawn. Soon afterwards another force was sent against them, and at length their patience was exhausted, and they determined to resist. Reinforcements arrived in H.M.S. 'Southampton,' and the Boers retreated to Pietermaritzburg, and eventually submitted. Natal was proclaimed to be British territory in 1843, and made a separate colony in 1856. This persecution caused another exodus. Once more the Boers struck their tents, placed wives and children in the wagons, with all their possessions, turned their backs on Natal, and headed for the wilderness. Crossing the Drakenberg, some settled in what is now the Free State, while others spread over Transvaal. Potgieter and his followers marked out a township, now called Potchefstroom. The land from the Vaal to the Limpopo was in possession of no dangerous tribes, and was free for them to settle in. A Government was formed, the laws of the old Dutch colony at the Cape were revived, and large areas were selected for farms.

Still, British attempts at interference followed them. Sir George Napier issued a proclamation, declaring that the emigrant farmers were not released from allegiance. In 1848 the Boers south of the Vaal were attacked by English troops, under Sir Henry Smith, and defeated at the battle of Boomplaats. Their leader Pretorius fled to Transvaal, under sentence of outlawry, but he was pardoned by proclamation in 1851. At length, on January 17th, 1852, British Commissioners signed a Convention (called the Sand River Convention), by which the independence of the Transvaal Republic was acknowledged. The British Government solemnly acknowledged the right of the farmers beyond the Vaal River to manage their own affairs, and to govern themselves according to their own laws, without any interference on the part of the British; and the British Government (by Article 3) disclaimed all alliances whatsoever and with whomsoever of the coloured nations north of the River Vaal.

After nearly twenty years of marching and fighting, privations and persecutions, the Boers had found a new country, and their right was acknowledged to govern themselves. If the British respected their own plighted word, the future independence of the long-suffering fugitives was secured. The Transvaal was officially styled the "South African Republic" in February 1858. Pretorious died in 1853, and his son became the foremost leader of the Transvaal settlers. In 1871, the younger Pretorius resigned, and Mr. Burgers, a Dutch colonist of note, born at the Cape, and educated in Holland, became President of the Transvaal Republic. He was an energetic and enlightened ruler, and was supported by the *Volksraad*, or Assembly. He made a treaty with Portugal, to secure access to the sea at Delagoa Bay, and obtained a promise of financial aid from Holland. But the English officials maintained

a policy of unfriendliness and obstruction, as is shown in the letter from Mr. G. P. Moodie, a member of the Transvaal Volksraad, in our number for December 1873 (p. 387). The Republic had to fight its way through wars, through debt, and all the difficulties incident to the establishment of a government with the crude materials at their command, without a helping hand being offered to it. When any irregularity in the management of the natives has occurred, the people of the Transvaal have been met by threats of arming the natives for self-defence. When the diamond fields were discovered within Transvaal territory, the district was taken from the Republic. Transvaal was refused a participation in the customs revenues of Natal, although its exports contributed largely to them. No opportunity was missed of showing unfriendly feeling to the struggling Republic.

Meanwhile, progress was made, and a settled government was established. The two northern districts are Zoutpansberg and Waterburg. The midland districts are Lydenburg and the gold fields, Middelburg, Pretoria, Rustenburg, and Marico; and the southern, Utrecht, Wakkerstroom, Heidelberg, Potchefstroom, and Bloemhoff. Utrecht is the district nearest to Natal, and its frontier is not more than a hundred miles from Durban. The most central district is Pretoria, which was the seat of Government. The white population of Transvaal is about 40,000, of whom 8,000 are men; and there are 250,000 natives. The farmers have large flocks and herds, and the wheat of Transvaal is the finest in South Africa; while the mineral wealth of the country is remarkable. The Lydenburg gold fields in the Drakenberg Range were discovered in 1873, about 150 miles north-west from Delagoa Bay.

The Government of the Republic was composed of a President and Volksraad, consisting of forty-two elected members, three for each district, one for each of the four chief towns—Pretoria, Potchefstroom, Lydenburg, and Rustenburg—and two for the gold fields. The President was elected for five years, and the Secretary was chosen by the Volksraad. A Supreme Court, presided over by a Chief Justice, administered Roman-Dutch law, and each district had its local magistrate's court. The revenue in 1874 was 71,846*l.*

The arrangement of President Burgers with the Portuguese Government for access to a seaport in Delagoa Bay, led to a claim from the British Government. It was a matter of great importance to the Transvaal people. For the distance of Potschefstroom, the largest town, was 419 miles to Durban, in Natal, and only 250 to Delagoa Bay. An account of the boundary dispute between the British and Portuguese, respecting Delagoa Bay, will be found at page 347 of our number for February 1873, with a map. The dispute was submitted for arbitration to the French Government, and Marshal MacMahon, of course, decided against the British claim.

This matter having been settled, President Burgers soon afterwards found himself obliged to resist the preposterous territorial claims of a Kaffir chief named Sicocoeni. He met with several defeats, but afterwards successes were obtained, and in time the disorders would have been suppressed.

But the difficulties of the Transvaal Government were taken advantage of by the Colonial Office, and Sir Theophilus Shepstone was, in 1876, sent out as a Commissioner to annex the country, in defiance of the Convention signed in 1852.

Sir Theophilus Shepstone, who was created a K.C.M.G. last year, is a colonial official who had been Secretary for Native Affairs at Natal since 1843. His policy is not considered by competent judges to have been beneficial to that colony. It has induced large numbers of Kaffirs to flock across the frontier, until they number 400,000, or 20 blacks to every white. Natal has been turned into a mere Kaffir settlement. Their abominable customs are fostered and encouraged. Their great object is to have as many wives as possible, for work, and daughters for sale. The women sales and purchases were permitted, and actually there was a fee of 5*l.* on every Kaffir marriage (*alias* daughter sale), yielding 15,000*l.* a year. It was not abolished until 1875. The legal price of a wife is now fixed at ten head of cattle. The manager of Kaffir affairs in Natal, was chosen to carry out the annexation policy in the Transvaal.

On the 12th of April 1877, Sir T. Shepstone issued a proclamation declaring that the territory of the Transvaal Republic was annexed to the British dominions, and troops marched to Pretoria. President Burgers and the Volksraad of the Republic entered a solemn protest against the annexation. The Convention of January 17th, 1852, bound the British Government to respect the independence of the Transvaal Republic. The annexation is, consequently, a breach of that Convention. But the address accompanying the proclamation of annexation declares that the Convention must be read between the lines, that "he who does not read between the lines sees but half the meaning." The Transvaal people are told that this other half of the meaning is that if they do not become a source of strength to their neighbours, and a strong centre of civilisation and Christianity, they may be annexed!! It is further alleged that a large proportion of the inhabitants of the Transvaal desire the annexation. But they were not invited to sanction it by any formal act, while their representatives in the Volksraad protested against it. The annexation of the Transvaal Republic is a breach of the Convention of January 17th, 1852, by which the British Government is bound, if that Convention is read in the usual way, and not between the lines.

JOHN McCLUER.*

MAJOR LEUPE, the learned keeper of charts at the Hague, has already done much for the elucidation of the history of geographical discovery in New Guinea. (See our number for March 1876, p. 72). He has now printed some letters throwing light on the extraordinary career of Captain McCluer, of our East India Company's service, the discoverer of McCluer Bay, at the western end of New Guinea.

John McCluer was one of the earliest of our Indian surveyors. He surveyed the whole west coast of India between 1780 and 1790, the resulting charts being prepared by his second, Lieutenant Wedg-

* *Captain John McCluer en zijn verrichtingen om de oost*, 1790-1795.

borough. Many of his smaller plans were engraved by Dalrymple. McCluer made one of the earliest plans of Bombay Harbour, he was the first to construct a chart of the Persian Gulf with any pretension to accuracy, and was far in advance of his time in his ideas of surveying. The close of Captain McCluer's career was remarkable. In August 1783, the East India Company's packet 'Antelope,' commanded by Captain Henry Wilson, was wrecked at the Pelew Islands. The natives treated the officers and crew with great hospitality, assisted them in building a small ship, and when they sailed in her for Macao in the following November, Captain Wilson took with him a son of the King of the Pelew Islands, named Prince Lee Boo. He was taken to England, and died of small-pox at Rotherhithe on December 27th, 1784. A few years afterwards Captain McCluer was ordered to proceed to the Pelew Islands to report the death of Prince Lee Boo. He was in command of two vessels, the 'Panther' and 'Endeavour,' with Lieutenant Wedgborough as his second. The 'Panther' sailed from Bombay on August 24th, 1790, and reached the Pelew Islands on January 10th, 1791, when the sad news was conveyed to the father of Lee Boo. McCluer had also been ordered to survey the north coast of New Guinea. In February 1791, he left the Pelew Islands, and was engaged in the survey until the following December, discovering the great inlet which was named McCluer Bay. The 'Panther' then returned to the Pelew Islands, when McCluer took a most extraordinary step. On February 2nd, 1793, he addressed a letter to Lieutenant Wedgborough, resigning the command of the 'Panther,' asking for arms and ammunition, which were given him, and announcing his intention of remaining on the islands. This having been arranged, the 'Panther' sailed under the command of Wedgborough, and returned to Bombay in August 1793. McCluer married natives and lived contentedly for thirteen months, when he got anxious for news, and went in an open boat to Macao. There he bought a vessel in order to return to the Pelew Islands for his family, at the same time writing to the Chairman of Directors of the East India Company, with an application to be reinstated in the service. He returned to the islands, took his family on board, and then went to Bencoolen. He sailed from thence, and neither he nor his ship were ever heard of again. But three of his wives had been sent to Bombay in another vessel and arrived safely. In 1797 they were sent back to the Pelew Islands at the Company's expense.

We learn the above particulars from a supplement to the later editions of Keate's *Pelew Islands*, entitled *Supplement to the Account of the Pelew Islands*, compiled from the journals of the 'Panther' and 'Endeavour,' two vessels sent by the H. E. I. C. to those islands in 1790, by the Rev. John Hockin." A chart with the tracks of the 'Panther' and 'Endeavour' on the New Guinea coast, was engraved by Dalrymple.

The letters lately printed at the Hague throw some light on the last few months of McCluer's romantic career. After a search among papers relating to Netherland's India between 1793 and 1798, in the archives at the Hague, Major Leupe discovered copies of two letters from McCluer written in 1795, in which he gives a short account of his adventures. They are addressed to the Chief Commissioner of the affairs of the Dutch East India Company.

The object of McCluer's first letter appears to be to defend himself against a charge of illegal traffic within the Dutch territories. He says that in 1790 he was sent by the English East India Company on a voyage to explore the coast of New Guinea, as it was supposed that there was a navigable passage in the north-east to the Aroe Islands, which might be of service for ships bound to China. He also had to visit the Pelew Islands, to announce the death of Prince Lee Boo, and to take the natives presents in return for their kindness to the crew of the 'Antelope.' During the voyage he was obliged to visit the Moluccas in September 1791, touching at the port of Bouro, where he received much kindness from the Resident. He went thence to Amboyna and Timor, and in October 1792 he reached Batavia. Between these visits he must have executed his New Guinea survey, and discovered McCluer Bay. He says that he went from Batavia to the Pelew Islands, where he remained for some time, to instruct the natives in the use of the presents sent by the Company, despatching the two ships to Bombay in command of the next senior officer. After fifteen months he became wearied of his residence at the Pelew Islands; so he got ready an open boat, and made a voyage to China with four men, reaching Macao in nineteen days. His sufferings during this voyage were very great, and after he recovered he bought a little vessel to return to the Pelew Islands for his family. Just as he was ready to depart, Captain Hayes, of the 'Batavia,' arrived at Macao in July 1794, and said that he had founded a colony in New Guinea, in a place called Restoration Bay. He ordered Captain McCluer to visit it with provisions, saying it was not far out of the way. McCluer consequently went to Manilla for provisions, then to the Pelew Islands, where he embarked his wives, and, finally, to New Guinea, finding the colony in a miserable state, twelve men being dead, fourteen prostrate with illness, and their ship, the 'Duchess of Clarence,' unable to go to sea from want of necessary articles, which McCluer could not supply. He, therefore, went to Bouro to obtain what was required. But on his return voyage eastward he sprung a leak, and was obliged to put into Geby. Having at last arrived in Restoration Bay, the 'Duchess of Clarence' was soon made ready for sea; but as the return of Captain Hayes was daily expected, McCluer waited until the 20th of March 1795. Hearing nothing of him, he sailed, leaving the colonists, whose ship was now ready for sea, to follow when they liked. On arriving at Amboyna he was received, not as a British subject, but as a spy. His ship and himself were placed in charge of a captain of a Dutch spice ship, "whose heart was black." At last he was allowed to sail. He had been accused of having spices on board, and of selling muskets to the Chinese; and this letter, dated April 25th, 1795, at Coupangs Bay, in Timor, is written to exculpate himself. The second letter, dated May 10th, 1795, reports that he left Amboyna on the 12th of April, and expresses the hope that he may receive redress for his treatment there. The letter is written at Fort Marlborough, Bencoolen, and is probably the last ever written by McCluer.

Major Leupe has illustrated the two letters with

several explanatory notes. The particulars respecting the unfortunate New Guinea settlement are new to us.

NOVA ZEMBLA (1596-1597). THE BARENTS' RELICS RECOVERED IN THE SUMMER OF 1876 BY CHARLES L. W. GARDINER, AND PRESENTED TO THE DUTCH GOVERNMENT. Described and explained by *J. K. J. de Jonge, Deputy Royal Archivist at the Hague.* Translated, with a preface, by *S. R. Van Campen.* With a map, illustrations, &c. (Trübner, 1877).

IN our number for November 1872 (p. 243), we reviewed the pamphlet by Mr. de Jonge entitled *Nova Zembla*, in which he gave the results of his careful examination of the first instalment of Barents' relics, brought home by Captain Carlsen. Lieutenant Koolemans Beynen has since given the complete descriptive list of these relics in his introduction to the new edition of the *Voyages of Barents*, published for the Hakluyt Society, which we reviewed at page 70 of our number for March 1877. In 1876 Mr. Gardiner went to Novaya Zemlya in his yacht 'Glowworm,' closely examined the winter quarters of Barents, and brought back many more relics, which he presented to the Dutch Government. An account of the voyage of the 'Glowworm' will be found in our March number, at page 71. Mr. de Jonge prepared a descriptive list of this second instalment of Barents' relics, a translation of which has now been published by Messrs. Trübner, with a preface by Mr. Van Campen, and an excellent chart showing Mr. Gardiner's track. The former report of Mr. de Jonge was dated July 10th, 1872. The present one, on the relics presented by Mr. Gardiner, is dated December 15th, 1876. It is preceded by a narrative of the proceedings of the 'Glowworm,' and of the circumstances under which Mr. Gardiner presented the collection to Holland. The most interesting relic is the manuscript which, after two days, Mr. de Jonge succeeded in deciphering. It proved to be the "scroll" signed by Barents and Heemskerck, and left at Ice Haven when they departed in the boats, in June 1597. Mr. de Jonge has also made out sufficient in a small manuscript book to be certain that it is the journal of the voyage of Barents in 1594. There are also an account book, a printed hymn book, remains of a Dutch-French dictionary, fragments of an atlas for northern navigation, fragment of a chart of England by Hondius, some coins, a fragment of a cross staff, a small compass in good order by Waghenaar, of Leyden (1584), a crutch which Mr. de Jonge suggests may have been used by Barents, who was very ill when they left their winter quarters—altogether 112 articles. In the first collection brought home by Carlsen there were 78 articles.

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TOURISTS' GUIDE TO THE UPPER ENGADINE. Translated from the German of *M. Caviezel.* By *A. M. H.* (London: Stanford. 1877).

THE Engadine is the name given to the beautiful valley of the Inn, one of the most important tributaries of the Danube, situated in the south-east portion both of Switzerland and of the Canton Grisons, or Grau Bund. The greater part of the Upper Engadine consists of a long, narrow, elevated plateau about 21 miles long, and varying from 1 to 3 miles in breadth. The lower part is occupied chiefly by wide meadows and pastures, and by dense forests of bright green larches and dark pines, and the upper part by a series of lakes flanked by lateral valleys, well adapted for pedestrian exploration. M. Caviezel dissipates a general illusion about the exceptional severity of the Engadine winter, by proof, based on meteorological observations, that its temperature may be compared with places in Germany and the Tyrol, situated fully 2000 feet lower. The scenery, as we can personally bear witness, is delightful; and the accommodation for English travellers was, at the time of our visit, a few years back, of a very comfortable description—*pace* the recent complaints in the *Times* touching the sewage of Pontresina, a discomfort we did not experience. The present book will prove of very material assistance to an intending visitor to this romantic region. Besides fulfilling all the *desiderata* in a guide-book of the ordinary stamp, it affords, *more Germanico*, full notes on the zoology, botany, and geologic characteristics of the district, and thus enables the traveller to acquire in addition some scientific knowledge of the locality. The book is accompanied by a map, in which heights are not unfrequently laid down, but in which the absence of any hill-shading makes it difficult for the real aspect of the country to be realised. We must observe, in conclusion, that the translator has done his work right well.

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LOANGO UND DIE LOANSKUSTE. Von *Dr. Pechuel-Lösche.* Leipzic. 1876. (London: Trübner & Co.)

DR. PECHUEL-LOSCHE, one of the members of the recent German Expedition to the Loango coast, under Dr. Güssfeldt, has reprinted from the *Mittheilungen* of the Leipzig Geographical Society an interesting little paper of his, of thirty pages, on Loango and the Loango Coast, the name applied to the tract of country intervening between the Atlantic and the slate-mountain range, which marks the ascent to the interior table-land of Africa, from the River Congo, northward to the Bay of Mayumba (6° to 3° 28' S. latitude). The shape of this tract is that of a narrow isosceles triangle, with a base of about 60 miles, resting on the northern bank of the Congo, and the apex at Cape Matuli. The central portion of this region formed the scene of Dr. Güssfeldt's attempt to penetrate inland, and Dr. Peshuel-Lösche has profited by his sojourn there to put together some very interesting notes on the physical aspect of the country. Taken in conjunction with Captain Burton's lively work, *Gorilla Land and the Cataracts of the Congo*, it affords us a vivid picture of the vicinity of the mouth of the giant river of Africa.

Cartography.

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Sheets of the Kumaon and Gurhwal Survey.

WITH reference to the criticism on Sheet No. 7 of the Survey of Kumaon and British Gurhwal, in our number for August last (p. 214), we understand that the original was drawn by Mr. J. Peyton, who was for many years the best hill draftsman in India, and is still one of the best. The hill-shading of almost the whole of the beautiful maps of Kashmir and Ladak in brush-work, now in the Geographical Department of the India Office, was done by him. As regards Sheet No. 7, he not only drew the map, but the ground also. He is the Surveyor who did the whole of the topography, and we regret the criticism in our August number, to the effect that the sheet is over-laboured with meaningless markings. A topographer so intimately acquainted with the ground as Mr. Peyton would make every mark convey a meaning on his map. It is true that the map looks heavy and inartistic, but this is owing to its being a photo-zincograph, and much inferior to the original. The criticism that in Sheet 21 the mountains are drawn in so different a manner from that employed in Sheet 7, that the two can scarcely be recognised as parts of one design, was made without personal acquaintance with the ground. Sheet 7 contains hills and plains, the former averaging 4000 feet in height, and nowhere more than 7000, and thickly studded with villages. Sheet 21 contains nothing

below 8000 feet, and chiefly mountains averaging from 12,000 to 26,000 feet, which are uninhabited. The ground in Sheet 7 was closely surveyed, that in Sheet 21 merely roughly reconnoitred. The method of survey and the nature of the country were totally dissimilar, and, consequently, the sheets could not be uniform. It should be added that Sheet 7 was put on the zinc in the month of August, which is the worst month at Dehra Dún for work of this kind, and hence its heavy appearance. The pressure for immediate publication is so great that the Department cannot afford to wait for the best times of the year to photo-zincograph. If the issue of the maps was delayed in order that they might be lithographed, the inconvenience caused by such delay would be very great, and the cost largely increased.

Stanford's Maps of the Seat of War.

MR. STANFORD'S large Map of the Seat of War in Europe is on a scale of 9 miles to the inch, in three sheets. The first sheet embraces the country from Plevna to the Black Sea, and from Bucharest to the Euxine, and is tinted, with the mountains in chalk. Heights are given in English feet, and the leading roads are shown in red. Not only are the mountain ridges and slopes very clearly defined, but much care has been taken to show the width of the river valleys, whether the streams are confined in ravines, or whether they wind through fertile plains. Positions of forests are also indicated. The second sheet is smaller, and is intended to show the country between Plevna and Sophia. It also includes Widdin and Nish. The third sheet embraces the country from Adrianople to Brusa, including Constantinople and the Sea of Marmora, the Dardanelles and Besika Bay. The Map of the Seat of War in Asia is not on so large a scale, 16 miles to an inch, with a larger scale map of Kars and its defences in one corner. The mountains have been drawn with great care, and this is the first good attempt we have seen to exhibit, with clearness and precision, the very complicated system of Armenian highlands. We here find the slopes rising on one side from the Black Sea, and on the other from the Eastern Euphrates to the first elevated terraces, then the second rise, and lastly, the lofty lateral valley, over 6000 feet above the sea, in which Erzeroum is situated, with the Kara-Su flowing in one direction, and the Aras in the other, from a central water-parting. The Soghanlu Dagh, and the descent thence to Kars, with its relation to Ararat and the rest of the Armenian system, are also very clearly defined. We have never before seen these complicated features so well and graphically illustrated. The plains are shown by a pale green tint; but we think that general tints such as are used in the other maps would have been preferable to the broad and strongly-defined colours here used to denote boundaries. The four sheets will prove most valuable companions in tracing the events of the war.

Stanford's Library Map of London.

THE new edition of Mr. Stanford's Map of London has been corrected up to the present year, and is now the standard map, and indeed the only correct map of the capital of the British Empire, for the ordnance maps are from seven to ten years old when issued. Miles of fields and market gardens have been converted into streets and squares, and covered with houses and public buildings since the first edition of Stanford's map was issued in 1865. When it is also remembered that *rookeries* have been destroyed, new thoroughfares made, and names of streets in many instances changed, it will be understood what an enormous amount of painstaking labour must have been devoted to the preparation of the new edition. There are a few mistakes in the orthography which should be corrected, as in some instances the origin of a name is historically interesting. Thus, it is not *Cannon* Row, but *Canon* Row, so called, as Stow tells us, because it belonged to the Dean and Canons of St. Stephen's Chapel. The minutest details will be found correct, even down to the interior ground plans of the Houses of Parliament, the Abbey, the Tower, and public offices. Great care has also been taken to show the railway stations, the starting and terminal points of the principal lines of omnibuses, and the new postal boundaries. The whole map embraces nearly 120 square miles, is divided into twenty-four sheets, and is beautifully engraved.

Log Book.

—:o:—

Use of Arrows by the Arctic Highlanders.—In my paper on the Arctic Highlanders, which forms one of *A Selection of Papers on Arctic Geography and Ethnology, presented to the Arctic Expedition of* 1875 *by the Royal Geographical Society*, at page 185, I say that the Arctic Highlanders have no bows and arrows. My grounds for making this assertion were that neither Kane nor Hayes refer to the use of bows and arrows among the Arctic Highlanders. Yet, singularly enough, the first thing that attracted the notice of Captain Feilden, the Naturalist of the 'Alert,' when he visited the Eskimo hut at Etah on July 29th, 1875, was a well-made arrow tipped with a metal head, and with three rows of feathers to guide it. Just to the eastward of Reindeer Point he found the remains of many old iglus, which appeared to have been long deserted. The roofs had fallen in, and a green mound revealed what was once a dwelling. All around these spots the ground was white with bones. Reindeer skulls and bones were the most numerous. Each bone that had contained marrow was split. The crania were either broken in through the temples, or the backs of the skulls were knocked off, in order to remove the brain. A careful search was made by Captain Feilden, and was rewarded by finding several articles of Eskimo manufacture, bone pins and needles, knives, harpoons, a wooden shade for the eyes, the shafts of two arrows, and a single flint core from which flakes had been struck. These "kitchen-middens" must, he believes, be of very ancient date; and the great quantity of reindeer remains proved to him that the Arctic Highlanders must have preserved some method of procuring these animals. The harpoon or dart would be unfitted for such a purpose; and the arrow shafts explained the presence of the reindeer bones.

The ethnological section of Captain Feilden's investigations will be exceedingly interesting. He has not only minutely examined the remains at Etah, but has traced the wanderings of the tribe up to the furthest point ever reached by uncivilised man, the furthest point, indeed, at which the continued existence of man is possible.

CLEMENTS R. MARKHAM.

The Norwegian Deep-Sea Sounding Expedition of 1877.—We gave an account of the arrangements for the Norwegian Deep-Sea Sounding Expedition in our number for August 1876 (p. 223); and we noticed the proceedings during 1876, in our numbers for September (p. 253) and October (p. 276). This year the same vessel, the 'Voringin,' under

Captain Wille, with Professor Mohn on board, left Tromsö on July 14th, and began work off Fuglö, in latitude 71° N. Three cross sections of soundings were made, the greatest depth being 1200 fathoms, on the north-east border of the deep-sea bay, abutting on the steep bank outside Vesteralen and Lofoden. Returning to Tromsö, the 'Voringin' sailed for Jan Mayen, on July 24th. The boundary between the Polar current and the warm Atlantic current (the so-called Gulf Stream) was found to be very steep, like that called the "cold wall," on the American coast. The 'Voringin' was anchored in a bay on the north-west side of Jan Mayen Island, and the scientific party spread in different directions, making collections of plants and rocks. Professor Mohn reports that the chart of Jan Mayen, based on the observations of Zorgdrager and Scoresby is accurate, except that the island is placed too far east by about half a degree of longitude. The height of Mount Beerenberg was 5836 feet, nearly 1000 feet lower than the height given by Scoresby. A depth of 1032 fathoms was found 7 miles north-west of Jan Mayen. On August 23rd the expedition returned to Bergen, with very satisfactory results. Next year the Norwegian Expedition will examine the region between North Cape, Jan Mayen, and the north of Spitzbergen, and possibly make a trip eastwards, in the direction of Novaya Zemlya, to determine the position of the isothermal line of 0° C. at the sea bottom, this line being considered the limit of the range of cod fish. The Norwegian Storthing has already voted the necessary grant for the Expedition of 1878.

Arctic Scientific Stations.—Count Wilzek and Lieutenant Weyprecht have published a programme of work for the proposed international Polar expeditions. The object is to obtain a set of meteorological, magnetic, and glacial observations extending over a complete year. The stations are to be on the north coasts of Greenland and Novaya Zemlya; in Finmark, near the North Cape; at the mouth of the Lena, in Siberia; at Point Barrow, in America; at one of the Danish settlements of Greenland; and on the east-coast of Greenland, near 75° N. The programme contains detailed instructions with reference to the registration of the observations. We trust that, before long, the English Government may be induced to undertake the East Greenland Station, which will serve as a depôt to an advanced expedition to the northward, employed on the more important work of geographical discovery.

The Programme was prepared in May 1877, to be discussed at the International Meteorological Congress to be held at Rome last September, but which was adjourned until next year.

Exploration in Northern Russia.—News has been received from M. Kelsief, who has been making researches during the past summer along the Murmanian coast and in Lapland, for the Moscow Anthropological Exhibition of 1879. M. Kelsief had been travelling with M. Singer, Secretary of the Natural History Society; and the two had, up to the time of their parting company on the borders of the White Sea, made a good collection of stone implements and other pre-historic remains. M. Kelsief then took a cruise in a small vessel, and traversed, with considerable difficulty, about 800 versts in all in the White and Polar Seas, and passed the whole of the summer within the Arctic circle. Along the Murmanian coast he visited the Lapps, who inhabit, there, subterranean dwellings, grouped at intervals of between 70 and 100 versts. He was accompanied by only one servant, and, after enduring considerable hardships through exposure and insufficiency of food, he started on the 29th August for the north of Finland, where he proposes to visit the Lapps of Lake Enara, and to return to St. Petersburg by way of Tornea.

Exploration of Upper Indus.—The portion of the Indus River where it emerges from Kashmir territory, and flows through the mountainous region of Gilgit and Chilas to rejoin our frontier near Darband—a strip in all of about 120 miles in length—has just received detailed exploration at the hands of a Punjab surveyor. This piece of work will complete our geographical knowledge of this river, and will contribute useful topographical information to our future maps, though it must be remembered that the general course of the river had been pretty accurately determined in 1870 by Captain Carter's careful triangulation of the peaks flanking its eastern and western banks.

M. Savorgnan de Brazza on the Ogowai River.—M. Savorgnan de Brazza writes, under date of the 17th of June, to say that his expedition had arrived at Doume, a village on the extreme verge of the Aduma country, situated on the Ogowai River, and in 0° 56′ S. latitude and 11° longitude east of Paris. He and his fellow travellers were in rather better health than they had been, and were intending to start eastward for the Ponbara falls, which, according to native report, are about 100 miles beyond Doume. Beyond these falls the direction of the Ogowai up stream is supposed to diverge somewhat southward and then to lie eastward. M. S. de Brazza reports that slavery is very rife on the river, and that the negroes sell their children, brothers, and friends, without the least compunction, to the slave dealers. He states that he has already come across several tribes, the names of which occur in Dr. Petermann's map, but at some considerable distance from where they really turn out to be, viz., M'Bamba or Obambe, Shake, Umbete, Bateke (a people who bring hither merchandise from the Congo), Anumbo, &c. The River Libumbay, which some geographers have described as a northern affluent of the Congo, turns out to be a feeder of the Ogowai on its left bank.

Belgian Expedition for the Exploration of Central Africa.—We learn from the *Bulletin* of the Belgian Academy of Sciences that an expedition has left Belgium for the exploration of Central Africa. Dr. Maes, of Hasselt, accompanies the expedition as Surgeon and Naturalist. The first Belgian station in Central Africa will be placed under the direction of Captain Crespel, assisted by Dr. Maes and Lieutenant Gambier. On arriving at Tanganyika, measures will be taken to ascertain whether it is possible to found a station on the shores of the lake, or, leaving a depôt there, it be fixed at Nyangwe or elsewhere in Manyuema. The place decided upon will act as a basis for further exploration, and agriculture will be carried on in order to make the expedition self-supporting.

Professor W. M. Gabb's Surveys in Costa Rica.—Dr. Petermann has published a map of Costa Rica showing the results of Professor Gabb's surveys made in 1873-4. He shows that our geographical knowledge of this country, up to 1873, was, for a civilised state, of the meagrest and most unsatisfactory character, and that the only parts of the country which had been actually surveyed were the east and west coasts, and the cross country route from Puerto Simon *viâ* Cartago and San José to Punta Arenas (and this, we cannot help exclaiming parenthetically, was the sum of our geographical knowledge of a state on which the confiding British capitalist eagerly showered down loans amounting to 3,400,000*l.* !!). In the years referred to, Professor W. M. Gabb, an American geologist and traveller, already known for his researches in the Californian peninsula, and in the eastern part of Haiti, surveyed and explored the entire district or province of Talamanca, which occupies the south-eastern portion of the Republic, and thus performed a very serviceable and important geographical exploit. Dr. Petermann has been in possession of this survey for nearly three years, but withheld the same from publication, apparently under the impression that it had been reproduced in the Republic. The amount of detail shown by the survey contrasts strongly with the still unexplored tracts lying to the west and north.

Correspondence.

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POLYNESIAN MIGRATION.

To the Editor of the "GEOGRAPHICAL MAGAZINE."

SIR,—Without entering into any discussion on the subject of the origin of the Polynesian races, the following particulars of the loss by fire, the abandoning, and the subsequent drift of the ship 'Ida Iredale' speak for themselves.

Having for four years traded in the South Pacific, amongst various groups of islands, I have bestowed some study to the subject of Polynesian ethnology, and through the courtesy of the owner of the 'Ida Iredale,' I am informed that the particulars are correct, excepting that the latitude should have been stated as 13° 20' South, instead of 12° 20'.

Better evidence of the winds and currents of this part of the Pacific Ocean could scarcely be obtained, and it goes far to uphold the theory of some thinkers, that the generally accepted opinions of the Malayan origin of the Polynesians is not so certain after all.

I am, &c.,

JOHN FINDLAY, F.R.G.S.

10, BELMONT CRESCENT, GLASGOW.

"EXTRAORDINARY VOYAGE OF A BURNING AND ABANDONED SHIP.—Her Majesty's Consul at Papeete, Tahiti, has forwarded to the Board of Trade a report as to the discovery of the derelict hull of the British ship 'Ida Iredale,' which was abandoned on October 15th, in the South Pacific, in lat. 12° 20' S., long. 107° 45' W., on fire from the spontaneous combustion of her cargo of coals. The crew of the vessel were landed at Tahiti, a distance of 2350 miles from the place where she was abandoned, in the month of December last. It now appears from the report of Consul Miller that on the 9th of June the steam corvette 'Seignelay,' a powerful vessel of the French Navy, was preparing to leave Papeete for the Paumoto Islands, when it was reported that a dismasted and abandoned ship was drifting off the western side of the island. The 'Seignelay' at once proceeded in the direction indicated, and fell in with the derelict 15 miles off Papeete. A hawser was made fast, and with considerable difficulty, owing to the rough sea and the unweildy bulk of the derelict, it was towed into Papeete harbour. From the still remaining marks, it was clearly identified as the 'Ida Iredale,' and was delivered over to the local authorities. A few days later an inspection of the hull was made by Consul Miller and Captain Turpie, master of the London missionary vessel 'John Williams.' Captain Turpie drew up a report of its condition, which was certified by Mr. Miller, and is enclosed by that gentleman in his despatch to the Board. Captain Turpie says:—"The whole of the woodwork, indeed everything combustible, has been consumed, leaving only the ironwork of what was once a remarkably strong and substantial vessel. The foremast has fallen over the port side and has entirely disappeared from the deck upwards. The bowsprit with a portion of the jibboom, still remains, though displaced from its position. The main and mizen lower masts, with all ironwork attached, remain within the structure, having fallen in. The bread and water tanks have evidently exploded after generating steam. The whole frame from 'tween-deck beams is sadly distorted and twisted by the action of the fire. Many of the beams are broken by the weight of deck fittings, &c. The collision bulkhead still appears intact. There still remains, I should suppose, about 100 tons of ashes and *débris*, which are still burning. No water is visible in the hold, and the iron plates of the ship outwardly appear little damaged. The bottom is clean, kept so, I imagine, by the intense heat. The figurehead is uninjured. From the position where she was abandoned to this place is about 2350 miles. The ship has, therefore, driven that distance between October 15, 1876, and June 9, 1877. The course made by the burning wreck I suppose to be about W.S.W., south of the Paumoto group; then meeting with the S.E. winds which prevail during April, May, and June, she has driven to the N.W. until taken in tow by the French man-of-war. It is a most remarkable thing that a burning ship should have driven over eight months in the Pacific without being reported, and that she should at last be brought into the port which her captain and crew had reached seven months previously.' The 'Ida Iredale' was a fine ship of 997 tons, built at Harrington in 1872, and owned by Mr. Peter Iredale, of Liverpool, She sailed last from Ardrossan."—*Shipping and Mercantile Gazette.*

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FUNERAL CEREMONIES AT THE NICOBAR ISLANDS.

(Extract from a letter of F. E. Tuson, Esq.)

"LAST night I went over to Malacca, and found that one of the old men had died suddenly, and been buried just before I got there. A raft of long trunks of trees, with a house on it made of cocoanut leaves, and with one large leaf placed upright to act as a sail, was lying opposite the dead man's hut, to convey away his 'iwi,' or spirit, when the 'mauloonnas,' or medicine men, had caught it. They are awfully afraid of these 'iwis;' and all the inhabitants were sitting in their houses, afraid to move out. They attribute all fever, and sickness, and calamity, to their 'iwis.' I found the 'mauloonnas' placing all the property of the deceased round about his tomb, and hanging up his hats, clothes, &c., on a post placed at his head. Everything a man or woman possesses is placed on his or her tomb, and never used again; the poultry and pigs are killed. The widow was in a house near, which was full of all the women in the place. She has to sit three days in a dark corner, with a cloth over her, and to see and speak to no one during

that time. The 'iwi,' it seemed, would not come till night-time, when everything was quiet, so I was unable to see the operation of catching it, but I found out the mode of procedure. The first thing was to eat up all the food in the village, with the exception of a little rice and bread-fruit, &c. The latter was placed in little pottles, like those used at home for strawberries, of a conical shape, about 2 feet long and 8 inches in diameter. These were hung about the dead man's hut and tomb. At night the 'iwi' was supposed to come and enter one of the pottles, to eat the food in it. The maulooennas would then steal up, and close the mouth suddenly and tie it up. It is then carried with great care to the raft, which is towed out to sea and let go. I saw the pottles all ready, neatly made of cocoanut leaves plaited together. I was told that the 'iwi' was invisible to all but the 'maulooennas,' an idea started, of course, by the latter. The natives all seem to believe in their powers; but whether they do so themselves, I do not know. It does not seem necessary to pack the 'iwi' off the same day the man dies; for the other day the sister of 'London,' the headman of Malacca, died, and her 'iwi' was not sent to sea till three months afterwards. The maulooennas appoint the day. Three months hence they will have a great feast, paint their faces red, and all get drunk and dance for two or three days. At the end of a year the body is dug up, and the skull thoroughly cleaned and re-buried. I have not ascertained the reason for this last ceremony. These people are a most interesting race, and very little is known about them."

Proceedings of Geographical Societies.

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HAMBURG GEOGRAPHICAL SOCIETY.

Meeting of 4th October, 1877.

DR. KIRCHENPAUER, Burgomaster, in the chair. The PRESIDENT made reference to the fiftieth anniversary meeting of German Investigators into Natural Science, which had been held during the 17th-23rd September in Munich.

HERR FRIEDERICHSEN read a paper on Costa-Rican geography, called forth by criticisms of Dr. Potakofsky in Berlin and Dr. Petermann in Gotha on his (Friederichsen's) Map of Costa Rica, published in 1875. He quoted the favourable opinion expressed by Professor Von Seebach, of Gottingen, one of the best-known authorities on Costa Rica, on the geographical value of his map; and with reference to Dr. Petermann's remark, that he (Dr. Petermann) had been in possession of the extensive surveys made by Professor Gabb in Talamanca, in the south-east of the country, for three years, Herr Friederichsen stated that he himself had been making efforts for some time to obtain Gabb's original surveys, but without success, as they had remained unpublished and unutilised until Dr. Petermann brought them out. Herr Friederichsen also observed that in Dr. Petermann's map there occur the names of certain Indian tribes, Orotiñans and Guetares, on the Gulf of Nicoya, where, according to Gabb, no Indians live, and that the height of Pico Blanco, in Talamanca, is given as 9652 feet, while, according to the same authority, it ought to be 11,877 feet.

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SPANISH GEOGRAPHICAL SOCIETY.

THE *Boletin* for August (Tom iii. No. 2) contains a paper by the President, Don Francisco Coello, completing the account of the proceedings of the African International Association. Spain was worthily represented by Don Rafael Merry del Val and Don Pascual de Gayangos.

This number also has a very curious account, by Captain Don Cesareo Fernandez Dero of the Spanish Royal Navy, of two Spanish travellers in Morocco. Early in the present century a traveller arrived at Ceuta, who gave his name as Ali Bey Abbassi, son of Othman Bey, and Prince of the illustrious House of the Abbassides. He gave out that he wished to visit the countries of true believers in Africa, on his way to Mecca. The traveller knew the language and literature of the Arabs; he was attended by servants and surrounded with luxuries, he was prodigal in his gifts, and a man of great learning. The Emperor of Morocco received him as a Sherif and Prince, and all mosques and fortresses were open to him during his residence in the country from 1803 to 1805. He was neither Prince nor Muslim, but an adventurer from Barcelona, named Domingo Badia, a man of great knowledge, a perfect linguist, cool and courageous, and with those rare qualities which enabled him to act so difficult a part with success. He succeeded in fixing the geographical positions of several places in Morocco, made natural history collections, and eventually printed a book entitled the *Travels of Ali Bey el Abbassi*.

Sixty years afterwards, in 1863, another traveller appeared on the coast of Barbary who gave out that he was Hajji Muhammad el Baghdadi. He also travelled over the greater part of Morocco, and wrote another book of observations and remarks on his journeys. But he travelled in a very different way from his predecessor. He affected poverty, and mingled with the lowest classes of the people. On his return to Spain he wrote a thoughtful and very curious book, which is infinitely superior to that of the so-called "Ali Bey el Abbassi." This second traveller was really Don José Maria de Murga y Magartegui, born at Bilbao, of good family, handsome, judicious, talented, and gifted with a great facility for learning languages. After studying at a college in Madrid he entered a cavalry regiment, and then travelled in England and Scotland, going thence to the Crimea during the siege of Sebastopol. Finally he undertook his remarkable journey to Morocco. His work is entitled *Recollections of Morocco by the Biscayan Moor, José Maria de Murga, or the Hajji Muhammad el Baghdadi* (Bilbao, 1868). It consists of a series of studies on the origin of the Sherifs, on the Moors, Arabs, Berbers, Jews, and Negroes. But the most curious chapter is on the "Renegades: a monograph on a family approaching extinction, and which was not described by Buffon; written by José Maria de Murga, who was a member of the family *in partibus infidelium*." In April 1873 he was in Morocco a second time, kept a careful journal, and returned in October. He went to Fez, Mequinez, Morocco, and Mogador, returning by Mazagan and Rabat to Tangiers. Long and very interesting extracts from his journal are given in the *Boletin*, as well as copies of some letters. He was on the point of setting out on a third expedition, when he died at Cadiz on the 1st of December 1876, being forty-nine years of age. It is to be hoped that the journals of Señor Murga, who was evidently an observant as well as an intrepid traveller, may find a suitable editor, and be published.

The *Boletin* next publishes an account of the levellings in Spain, which follow the lines of the principal roads, with tabulated lists; and concludes with the usual miscellaneous geographical notes.

NOTICE.

The Office of THE GEOGRAPHICAL MAGAZINE *is at* 57 *&* 59, *Ludgate Hill, E.C.*

Manuscripts sent to the Editor cannot be returned, nor can the Editor be responsible for them.

Map of
THE
KRISHNA BASIN.
Scale of Statute Miles.
0 10 20 30 40 50 100
74
78
82
18
14
BOMBAY
Thana
Ahmednagar
R. Godavari
Indrawati R.
Manjura R.
Bhima R.
Nira R.
Poona
Satara
Sholapur
HAIDARABAD
NIZAM'S DOMINIONS
Musi R.
HAIDARABAD
Nelgunda
Kulburga
Bijapur
Sagar
R. Krishna
Warna R.
Gulparba R.
Gokak
Belgaum
Mulpurba R.
Dharwar
PANJIM or NEW GOA.
Raichur
Mudgal
Karnul
Krishna
Masulipatam
Nizampatam
Ellore
Kolair
Godavari
Samalcota
R. Tungabhadra
VIZIANAGAR (RUINS)
CEDED DISTRICTS
Ballari
114 Tanks
Karnul
15 Tanks
Nellor
116 Tanks
Cudapa
75 Tanks
Penner R.
Cudapa
Nellor
Krishnapatam
Shimoga
Chitaldrug
Kaidur
Tumkur
MYSOR
BANGALOR
Kolar
N. Arcot
477 Tanks
MADRAS
Pulicat Lake
T. PETTITT & Co. LITH. LONDON.